

A Hayden Publication

April 1982 \$2.00

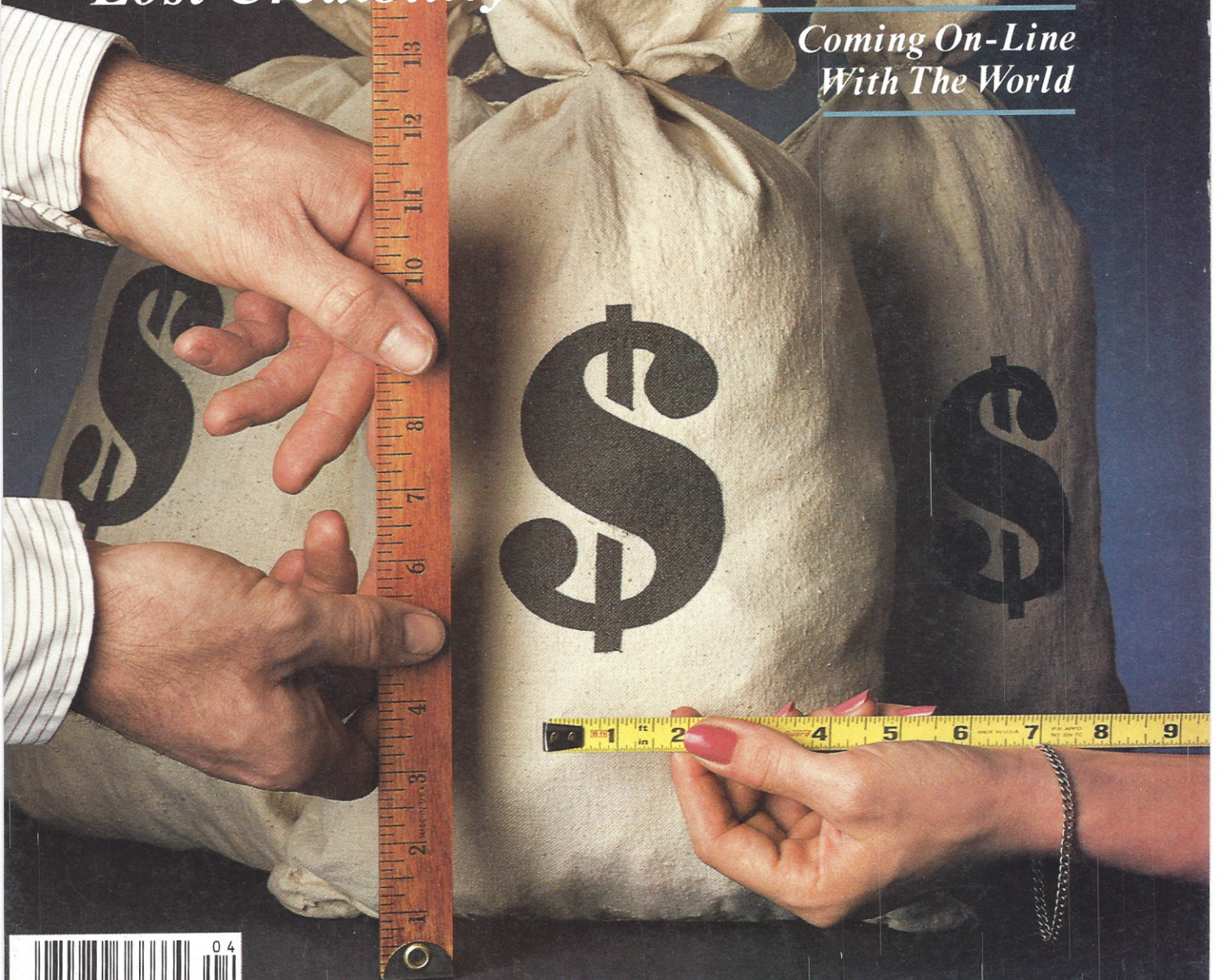
PERSONAL COMPUTING

*Have Your
Cost Estimates
Lost Credibility?*

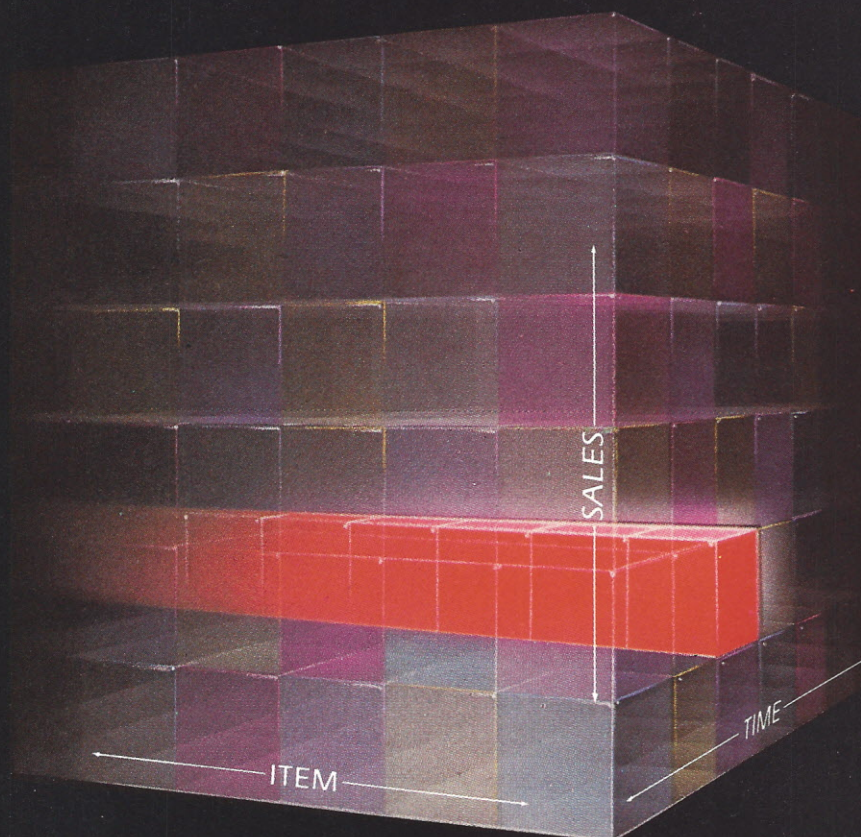
*Spreadsheets: Your
Scenario For Success*

*New Partners:
Video And Computers*

*Coming On-Line
With The World*



Report Manager™ and the PC-8000 Personal Computer: An unprecedented three dimensions of management information.

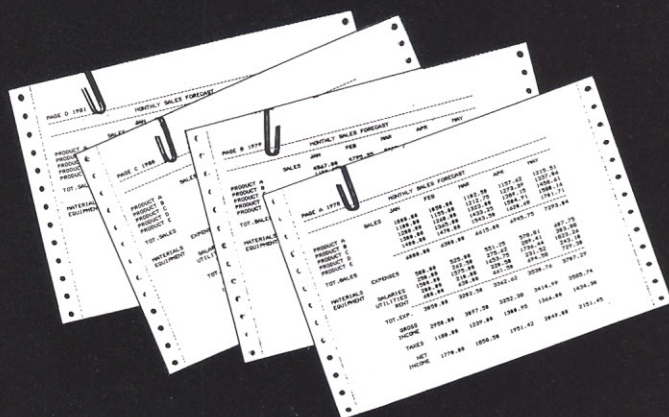


All those legendary electronic spread sheets that have been making other kinds of personal computers so useful for managers are now literally flat by comparison to the remarkable combination of Report Manager™ and the NEC PC-8000 Personal Computer.

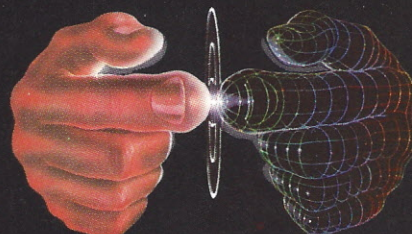
Here you get the power and versatility of an electronic book, not a mere electronic page. An axis of depth joins the horizontal and vertical—so you can, for instance, track a number of different profit centers over the same period of time...or follow actual performance against projections by both department and time frame.

The fact is that any sort of planning work you find useful in two dimensions, you will find that much more useful in three. The program allows you to see four separate "slices" of your 3-D "Data Cube™" on one screen, for fast, real time comparisons. There are, besides dozens of math and editing functions, built-in clock and calendar functions, too—an immensely useful convenience for scheduling, flow-charting, project management, and the like.

Watch Report Manager run—easy as A, B, C and powerful as X, Y, Z—on the PC-8000 at any NEC Home Electronics (USA) dealer.



Sample printout showing use of X, Y, and Z axes.
Report Manager and Data Cube are trademarks of The Image Producers, Inc.



**Productivity
at your fingertips**

NEC

**NEC Home Electronics (USA)
Personal Computer Division**
1401 Estes Avenue
Elk Grove Village, IL 60007

This is all you really need!

An Apple II®, a printer, a video screen, a modem, a disk drive,
CPS Multifunction, and RAMPLUS+.

The CPS Multifunction card and cables are all you need to connect almost any printer, modem, or terminal to your Apple II®. It's really three cards in one. It provides the capabilities of a serial interface, parallel output interface, and real-time clock/calendar. It saves you money, power, and slots. The CPS Multifunction is compatible with DOS, CPM, PASCAL, and BASIC. Suggested retail price \$239, including software. Cables \$24.95 each.

The RAMPLUS+ card allows you to expand the available memory of your Apple II® to 80K. RAMPLUS+ has two 16K banks of RAM. The card is supplied with 16K of installed RAM, with an additional 16K of plug-in RAM available. It is compatible with DOS, CPM, PASCAL, and BASIC, also. Suggested retail price \$189. Additional 16K RAM \$24.95.



Mountain Computer
INCORPORATED

300 El Pueblo, Scotts Valley, CA 95068
TWX: 910 598-4504 (408) 438-6650



The modem is a product of
Hayes Microcomputer Products, Inc.
The video screen is a product of NEC.
The printer is a product of Epson America.
The Apple II® is a product of Apple Computer, Inc.
The disk drive is a product of Apple Computer, Inc.

CIRCLE 2

April 1982

Volume 6 Number 4

A Hayden Publication

PERSONAL COMPUTING

David Gabel
EDITOR

Susan Foster
MANAGING EDITOR

Jeffrey Rothfeder
ASSOCIATE EDITOR

Elli Holman
ASSISTANT EDITOR

Lee Thé
FIELD EDITOR

Cecilia Wessner
COPY EDITOR

Dorie McDonald
EDITORIAL ASSISTANT

Robert G. Bryant
DESIGN & ART CONSULTANT

Vince Cicenía
PRODUCTION MANAGER

Carol Tabak
PRODUCTION ASSISTANT

Leslie Bouffard
PROMOTION MANAGER

John D. Klingel
CIRCULATION CONSULTANT

Barbara Freundlich
CIRCULATION DIRECTOR

Robert Paratore
CIRCULATION MANAGER

Paula Greenleaf
READER SERVICE

Maxine Sassano
MANAGER OF
DEALER SERVICE/REPRINTS

Robert J. Lydon
PUBLISHER

COVER PHOTOGRAPHY
GEORGE B. FRY III

DEPARTMENTS

5 EDITORIAL

7 LETTERS

8 ANSWERS

18 OUTLOOK

26 ESSAY

82 HARDWARE OF THE MONTH

96 HARDWARE INDEX

102 SOFTWARE OF THE MONTH

106 SOFTWARE INDEX

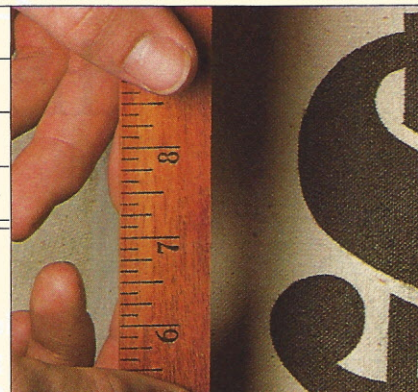
118 BOOK REVIEWS

166 PERSONAL COMPUTING DEALERS

167 ADVERTISERS' INDEX

FOR SUBSCRIBER CHANGE OF ADDRESS: Fill out coupon in this issue. Attach old mailing label, or write in your subscriber ID# which appears above your name. Fill new address information and send to Personal Computing, P.O. Box 1408, Riverton, NJ 08077. Allow 6-8 weeks for address change to become effective. BACK ISSUES OF PERSONAL COMPUTING are available on microfilm, microfiche, 16mm or 35mm roll film. They can be ordered from Serials Processing Dept., University Microfilms International, 300 North Zeeb Rd., Ann Arbor, MI 48106. For immediate information, call (313) 761-7490. HAYDEN PUBLISHING CO., INC., PUBLISHERS: Electronic Design; Computer Decisions; MicroWaves; Personal Computing; Electronic Design's Gold Book; MicroWaves' Product Data Directory; Hayden Books; Hayden Software. PERSONAL COMPUTING (ISSN 0192-5490) is published monthly by Hayden Publishing Company, Inc., 50 Essex St., Rochelle Park, NJ 07662. James S. Mulholland, Jr., President. Printed at World Color Press, Inc., Mt. Vernon, IL. Second class postage paid at Saddle Brook, NJ and at additional mailing offices. Copyright© 1981, Hayden Publishing Company, Inc. All rights reserved. POSTMASTER: Please send form 3579 to PERSONAL COMPUTING, P.O. Box 1408, Riverton, NJ 08077. Subscription rates: U.S. 1 year (12 issues) \$18; 2 years (24 issues) \$33; 3 years (36 issues) \$46. Canada & Mexico: add \$4/year for surface mail, \$8/year for airmail. Other countries: add \$8/year for surface mail, \$36/year for airmail. Back issues: U.S.: \$4. All other countries: \$5. Audited Paid Circulation. 224,838 copies of this issue printed.

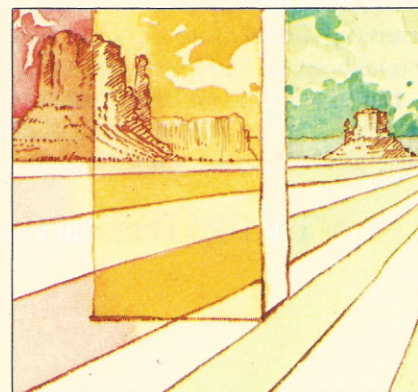
Cover story begins on page 30.
Estimates can come within 5% of final costs if a computer does the reckoning.



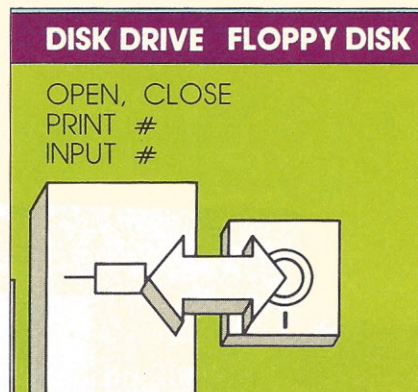
COVER



PAGE 47



PAGE 59



PAGE 73

FEATURES

22 INTERVIEW **A PERSONAL COMPUTING INTERVIEW WITH TONY GOLD**

In a few short years, Lifeboat Associates grew from the kernel of a software dream into a multinational software reality. Tony Gold, President of Lifeboat, discusses the history of this phenomenal business growth, along with his future view of personal computing.

30 BUSINESS **HAVE YOUR COST ESTIMATES LOST CREDIBILITY?**

By Alan Radding

Used to be that raw materials + labor + overhead = cost. But today, the number of factors involved in accurate cost estimating has skyrocketed, making traditional formulas nothing more than exercises in squandering time.

36 SPECIAL REPORT **COMING ON-LINE WITH THE WORLD**

By David James

If it's information you need, and you don't want to lose your backyard swimming pool to a satellite dish, let your phone lines do your walking. Your only limitation may be your pocket.

46 LEISURE **SEAWORTHY COMPUTERS MAKE FOR SMOOTH SAILING**

By Jeffrey Rothfeder

With personal computers as their handmaidens, sailors are turning away from traditional maritime ways. The ease of charting direction and monitoring position has now allowed time to do what sailors do best—enjoy sailing.

52 PROFESSIONAL/MANAGERIAL **WATCH SALES SOAR AS INEFFICIENCY EBBS**

By Bill Suydam

What would the ultimate sales tool be? No, this one won't close for you, but it will make that presentation easier and more believable, especially now that the software folks are getting more deeply involved in sales software development.

58 PROFESSIONAL/MANAGERIAL **SPREADSHEETS: YOUR SCENARIOS FOR SUCCESS**

By Myron Berger

Considered by some to be the most powerful sort of software around, spreadsheets provide business and corporate financial planners with the rudiments of in-the-black balance sheets.

64 EDUCATION **NEW PARTNERS IN TECHNOLOGY: VIDEO AND COMPUTERS**

By Jordan Gold

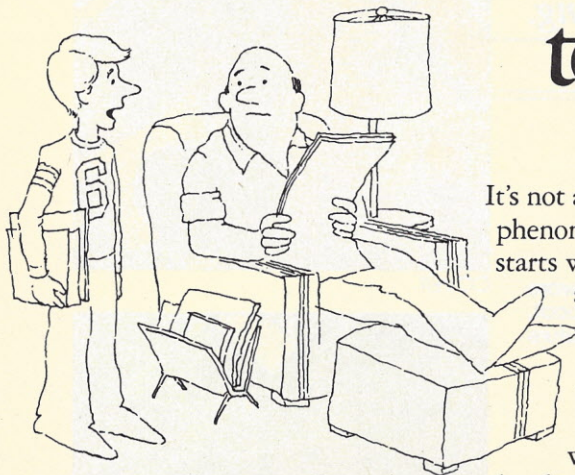
Videodisk and videocassette technologies are being teamed with computers for training purposes. The result: increased motivational levels and attention spans, to say nothing of a new price competitive storage medium.

72 ADVANCED **A PROGRAMMING PRIMER—PART II**

By Leon Starr

Is your computer capable of accomplishing a particular task? Ask it. Part II of this three-part programming series shows you how to design the necessary algorithm to do so.

"Dad, can I use the IBM computer tonight?"



It's not an unusual phenomenon. It starts when your son asks to borrow a tie. Or when your daughter wants to

use your metal racquet. Sometimes you let them. Often you don't. But when they start asking to use your IBM Personal Computer, it's better to say yes.

Because learning about computers is a subject your kids can study and enjoy at home.

It's also a fact that the IBM Personal Computer can be as useful in your home as it is in your office. To help plan the family budget, for instance. Or to compute anything from interest paid to calories consumed. You can even tap directly into the Dow Jones data bank with your telephone and an inexpensive adapter.

But as surely as an IBM Personal Computer can help you, it can also help your children. Because just by playing games or drawing

colorful graphics, your son or daughter will discover what makes a computer tick—and what it can do. They can take the same word processing program you use to create business reports to write and edit book reports (and learn how to type in the process). Your kids might even get so "computer smart," they'll start writing their own programs in BASIC or Pascal.

Ultimately, an IBM Personal Computer can be one of the best investments you make in your family's future. And one of the least expensive. Starting at less than \$1,600[†] there's a system that, with the addition of one simple device, hooks up to your home TV and uses your audio cassette recorder.

To introduce your family to the IBM Personal Computer, visit any ComputerLand® store or Sears Business Systems Center. Or see it all at one of our IBM Product Centers. (The IBM National Accounts Division will serve business customers who want to purchase in quantity.)

And remember. When your kids ask to use your IBM Personal Computer, let them. But just make sure you can get it back. After all, your son's still wearing that tie.

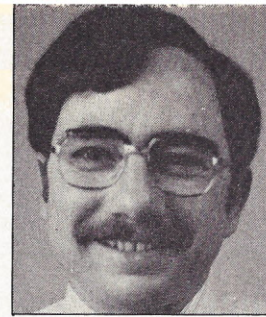
IBM®

The IBM Personal Computer and me.



[†]This price applies to IBM Product Centers. Prices may vary at other stores.

For the IBM Personal Computer dealer nearest you, call (800) 447-4700. In Illinois, (800) 322-4400. In Alaska or Hawaii, (800) 447-0890.



Now Why Did They Do That?

Well, we did it. We said that *Personal Computing* would be different in April than it was before. It clearly is.

Now that the change has been made, you will surely wonder at the reasons behind the move. We think you deserve an explanation of that motivation.

We're very much in touch with the personal-computing industry. We know that one of the popular industry buzzwords is "user-friendly." Systems have to be user-friendly. Software has to be user-friendly.

You get the idea.

But "user-friendly" is more than a buzzword. User-friendliness is almost a prerequisite if all the people who could benefit from personal computing are to actually do so. And what it means is that the systems should be easy to use. You shouldn't need an advanced degree in computer science or electronics to use a personal computer.

The personal-computing industry is "on-board" with user friendliness. As we talk to the companies involved we find that one of the salient features of almost all new hardware and

software is user friendliness. It's likely that in the near future, personal computing will have advanced to a point wherein we'll really be able to sit down at our computers and DO THINGS—without spending a lot of precious time before we can get started with our applications.

In short, it looks like "user-friendly" will, more and more, be the dominant characteristic of personal computing.

We think it's essential that *Personal Computing* magazine is also user-friendly, or "reader-friendly." You shouldn't have to work hard to get what you need from *Personal Computing*. And when you have finished reading it, you should have received useful information that helps.

We changed the look of the magazine to make that easy. But we did more than that. We've added departments, too—book reviews and a question-and-answer department. These new aspects provide you with more of the information you need. We've also redone the new-products section to make it easier than ever to find out what the marketplace has to offer. And if you need more in-depth

information you'll get that too.

But what about that new look? It's more sophisticated, but not dull. It's more businesslike, but not stodgy. It's a look that's graphically in tune with the people who use personal computing. You're movers, doers. You know where you're going and what you need to get there. You can't be slowed down in your search for information any more than you can be delayed in any other area of your life. Our new design speeds your search, and at the same time conveys *Personal Computing's* image—the businesslike magazine of people and computers.

Still, we're reader-friendly. You can put your feet up, relax and enjoy this magazine.

You'd think that there won't be so many changes in *Personal Computing* from now on. And indeed we don't think there will be such drastic change in the foreseeable future. But we're like you—always changing, always improving. As we do, we'll serve you better, you'll do better, and we can win together.

Which is what it's all about, anyway.

COMING NEXT MONTH

Making music with micros

Composers from Julliard to Broadway are doing some of their best work on personal computers. But musical genius is not a necessity for composing melodies on your micro.

Clearing commodities confusion

Few understand the mysteries of the commodities market but personal computers are cutting through the chaos, allowing the user to speculate with less uncertainty.

Hurray for Hollywood

Could it be that the personal computer is the new casting couch? Just as computers are being used to streamline operations in more staid industries, production studios are using computers to streamline time in this fickle and fanciful fast-paced world.

The truth about telecommuting

Though many companies resist telecommuting, some enlight-

ened firms have offered working at home as an alternative workstyle for their employees. The social and psychological changes involved are causing problems for some of these people, and relief for others.

Do you need to upgrade your system?

Watch out for dangers and pitfalls when deciding to upgrade your present system. Knowing what to look for and what you need are purchasing prerequisites in all cases.



A simple fact:

The considerable *benefits* of a personal computer like the Osborne 1® are often intangible, often exciting, and always expanding.

The *value* of the Osborne 1 is clear and simple:

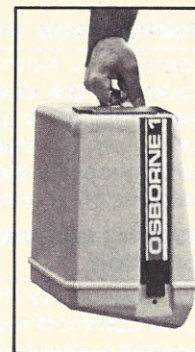
\$1795. Complete.

\$1795 includes this hardware:

- ☐ Z80A™ CPU with 64K RAM
- ☐ Dual floppy disk drives with 100K bytes storage each
- ☐ 5" CRT
- ☐ Business keyboard with numeric keypad and cursor keys
- ☐ RS-232C Interface
- ☐ IEEE 488 Interface
- ☐ Weather-resistant, portable housing
- ☐ Operates on European and American voltages

\$1795 includes this software:

- ☐ CP/M® Operating System
- ☐ WORDSTAR® word processing with MAILMERGE
- ☐ SUPERCALC™ electronic spreadsheet
- ☐ CBASIC®
- ☐ MBASIC®



OSBORNE

Available at your local computer retailer.
CIRCLE 4

Trademarks: Z80A: Zilog Corporation
SUPERCALC: Sorcim Corporation
Registered Trademarks:
OSBORNE 1: Osborne Computer Corporation
CP/M: Digital Research MBASIC: Microsoft
CBASIC: Compiler Systems, Inc.
WORDSTAR, MAILMERGE: MicroPro International

LETTERS

WHY RETIRE IF YOU DON'T WANT TO?

I recently purchased my first newsstand copy of *Personal Computing*, and find it very interesting, as do my classmates in our personal-computer class at college.

I am supposed to be "retired," but I prefer remaining active and keeping abreast of the times. Thus, I am very interested in the renewed movement toward "cottage industries," in which companies are placing computers in the homes of their workers. These industries not only save energy, time and expense for the employee, but massive overhead and expense for the employer.

So, I am writing to you for any suggestions and whatever information you might have about this subject. I will complete the course on the Apple II this month and need to supplement my pension income.

Doris L. Garlick
VISTA, CA

EDITOR'S REPLY: Back to that newsstand for our May issue, which will cover "telecommuting" in depth. Or, if you really want to save gas, why not subscribe?

MEDICAL MYSTERY

The article entitled "Computers investigate that research rapidly, reliably" on page 45 in your February 1982 issue contains references to MEDLINE and Dialog, biomedical information networks. Could you let us know how we can get in touch with these organizations?

Richard O. Langham
ASSISTANT ADMINISTRATOR
NORTHERN DUCHESS HOSPITAL

EDITOR'S REPLY: Contact Carolyn Tilley, U.S. National Library of Medicine; (301) 496-6193.

"Hayden's *Personal Computing* magazine's accuracy policy: to make diligent efforts to insure the accuracy of editorial material. To publish prompt corrections whenever inaccuracies are brought to our attention. Corrections appear in 'Letters.' To encourage our readers as responsible members of our business community to report to us misleading or fraudulent advertising. To refuse any advertisement deemed to be misleading or fraudulent."

LOST IN THE MAIL

We found Robert Perry's article on mailing-list programs (January 1982, page 76) to be well thought out and informative. We wish to inform your readers, however, that MAIL LIST 2.2 listed in the article is available only from Artworx Software. Further, the program has been upgraded to a 3.0 version, which now employs full editing, quicker deletion capabilities and automatic five- or nine-digit ZIP code recognition.

The price for MAIL LIST 3.0 is \$49.95 and is available for the Apple, Atari and North Star computer systems.

Arthur M. Walsh
PRESIDENT
ARTWORX SOFTWARE
150 N. MAIN ST.
FAIRPORT, NY 14450

1982: THE YEAR THEY LOST CONTROL

I endorse the positive suggestions made by psychologists that people should deal with their frustrations when working with computers ("Technology shock is manageable") (February 1982, page 55). I think, however, that the level of frustration goes much deeper than suggested. We should not underestimate the legitimate causes of individual frustration in dealing with our technological world. Frustrations aren't just "hangups" or "feelings." They are genuine emotions, stemming in large part from the reality that individuals in our society are becoming less and less capable of personally dealing with most of the critical factors affecting their lives.

Many technological changes create situations over which the individual has lost control. Throughout a person's life in 1982 America, he is faced with technological gadgets of varying levels of sophistication that fail to produce their promises: automatic bank tellers that fail to deliver, vending machines that take your money and don't produce, and newspaper boxes that refuse to open. In each of these situations, the individual is helpless; there is usually not a thing that can be done about it and there is no human interaction possible that would solve the problem.

Moving up the technological ladder to computers, too many of us have had our lives disrupted because, we are told, "the computer broke down." Because of these breakdowns, bank statements have been overdue, paychecks misdelivered, er-

roneous deposits made in bank accounts, bills received for items not purchased, magazines have not been delivered, and airline tickets could not be printed. Everyone can provide his own examples. In these situations it is very difficult to get action taken. Most people you contact will not assume responsibility for a computer error.

Is it any wonder that some people approach a computer for the first time with a bit of apprehension?

Samuel T. Frear
EUGENE, OR

BUGLE CALL FOR BIG BLUE

I am in the process of developing a data base for the IBM Personal Computer. I plan to publish two monthly listings: one will list new additions in hardware and software, and the other will list all the software and hardware available to that date.

The lists will be indexed by title and source. Also included will be classification of the product, its name, a description, configuration required, available form, price and source.

Interested parties developing hardware or software should write as soon as possible to include their products in the list. Persons looking for available products should also write.

Dr. Kailash Chandra
SAPANA MICRO SOFTWARE
P.O.B. 748
QUINCY, IL 62301

ON THE VALUE OF A DOLLAR

When I first saw an advertisement for your magazine, I thought: "It must be a relatively small publication to be offering subscriptions for such a small amount of money." But then, in September, I received my first issue. I was surprised to find it full of many beautifully written and organized articles. Now I think I'm getting my money's worth. I also have an INTERACT computer for sale. If anyone is interested, please write.

Jeff Wendt
406 LEWIS ST.
ROCK SPRINGS, WY 82901

EDITOR'S REPLY: It pleases us greatly to know that our readers think we're giving them value for their dollar. We are. Especially if we run a free classified.



AT&T Well Positioned For Personal-Computer Market

In this new monthly column, "Answers," we will respond to your most frequently asked general questions about personal computing. Please send your questions to: Answers, Personal Computing, 50 Essex St., Rochelle Park, NJ 07662.

Q. With the recent settlement of the government's anti-trust case against AT&T, which allows the phone company to enter previously restricted data-processing markets, what kind of personal-computing equipment is expected to develop?

A. It is difficult to accurately pinpoint AT&T's future direction. Congress still intends to act and have its hand in charting the phone company's new look. However, by examining Bell's recent software development and the work of Bell Labs, the firm's research arm, some observers—including the consultants International Resource Development (IRD)—have gleaned clues to AT&T's course.

The area of computer technology that AT&T is expected to enter in a forceful way is the corporate personal-computer market with the so-called desk-top workstation. According to IRD: "AT&T has already shown great creativity in prototyping these workstations, and is one of the few companies in the industry including IBM that has more experience than Xerox in researching the human factors of workstation design. It is working toward making the computer as easy to use as the telephone."

It is known that AT&T has already developed several prototype personal-computing machines including one that can listen to a user, recognize and then dial a spoken number; another that retrieves information from advanced videodisks

which can contain whole research libraries; and still another that electronically edits everything from misspellings to clichés to run-on sentences.

AT&T is basing a good deal of its personal-computer-workstation plans on the coming development of fiber-optic, local office networks. Fiber optics are long, clear threads that transmit data over shooting lasers that pulsate through the glass fiber. The fiber-optic networks, which Bell hopes to use for tying together the corporate computer equipment it sells, will enable the machines to speak to each other within a firm's electronic environment.

Fiber-optic networks are expected to overtake broadband cable networks—currently the dominant force in offices—by the 1990s. They will be fast and able to carry massive amounts of information. Bell Labs has led much of the research in this area as AT&T expects to also be using fiber optics for common phone transmissions in the next decade.

Q. I'm getting a lot of glare off my CRT. Is there anything I can do about it short of buying a new monitor/terminal?

A. Shaw once said "An Englishman thinks he is moral only when he is uncomfortable." If you're willing to risk the raised eyebrows of your peers and take your comfort seriously, there are things you can do.

First, you can minimize window-caused glare by making sure your CRT is at right angles to the window. It may ruin your decor to do so, but no one ever said the laws of physics were fair. Second, you can minimize overhead light glare by making sure your monitor is not tilted back. If you're tall, you might put it on a

shelf, or on your disk drive(s). If the CRT is built into the keyboard housing you can't do this, but don't despair: You can go to a Radio Shack dealer and buy a \$17 nylon glare screen that can be affixed to your monitor with self-adhesive strips built into its frame. It's designed for 12-inch monitors with a flat frame around the CRT. We modified one at one of our *Personal Computing* field offices to fit a BMC monitor, which has a very convex housing. It works admirably.

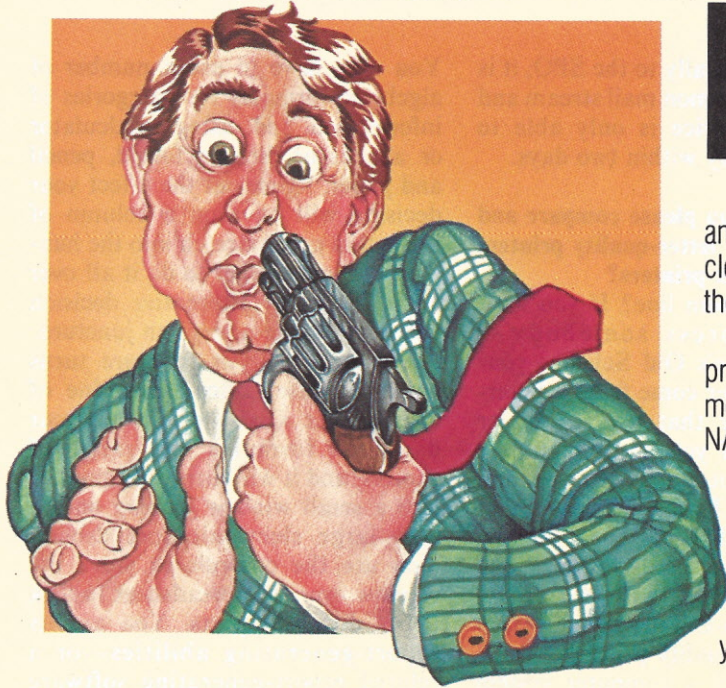
Another alternative is to go to your local stationery store and buy some black poster board. Fashion a hood for the monitor, extending out as far as possible both on top and to the sides. Some computer supply stores offer a plastic fits-all hood for about \$20 that does the job just as well.

Q. What is electronic mail and what role does the personal computer play in it?

A. Electronic Mail is a catch-all phrase that covers a wide range of computerized correspondence capabilities from in-house to cross-country systems. In broad categories it breaks down like this:

- Inter-office electronic mailings: memos, documents, reports, etc. are sent by computer, to in-house offices at a corporation. Personal computers can be cabled together through an in-house wiring nexus, called local networks, that enable the machines to "speak" to each other and mail the correspondence over the wires. A printer can be added to the network so that the receiving party can get a hard-copy printout of the mailing.
- Long-distance electronic mailings: correspondence is sent over long-distance via computer. The personal computer is simplifying this type of

STOP STEALING FROM YOUR OWN BUSINESS



Here's the white collar crime of 1981: Let your people labor away for hours at jobs a properly trained computer can do in seconds.

You **pay** for all those wasted hours.

And you're **missing opportunities**, because the hours could be spent on new, productive, profitable projects.

We can help you.

If you have a CP/M®-based microcomputer, SSG's Business Productivity Packages will scoop up all those hours you're losing and give you back more productivity, more time, more information, and more success.

ANALYST. \$250. An information storage and retrieval (data base) system that will replace piles of files with information you can **USE**.

MAGIC WORKSHEET. \$250. SSG's answer to the world's demand for electronic spreadsheet calculation and "what-if" capabilities on CP/M systems. (Available quarter two 1981.)

NAD Name and Address. \$100. A mailing

and addressing system to do all the typing and clerical work on lists—from ten names to ten thousand.

LETTERRIGHT. \$200. A correspondence processing package that speeds letter writing **AND** merges your letters with names selected from your NAD list.

It takes very few hours at today's salary levels to repay the cost of any of these systems. They'll do you far better than that. SSG's Productivity Software Packages will contribute immediately to the growth and success of your business.

Please act now. **Tear out this page.** This coupon or a phone call will get you immediate relief from the white collar crime of 1981. We'll send you complete information. Or better still, answer your questions **immediately**.

Time's a-wasting.
That's a crime.

- ☐ Please rush me information on the SSG Business Productivity Packages for CP/M-based computers.
- ☐ Please call me right away.

Name _____
Company _____
Address _____
City State Zip _____
Telephone () _____



CP/M is a registered trademark of Digital Research. NAD, Magic Worksheet are trademarks of SSG.

Structured Systems Group

5204 Claremont, Oakland, California 94618 (415) 547 1567

CIRCLE 47

INCORPORATED

electronic mail considerably. In mailings between companies with institutional computer systems, lack of machine compatibility between the sender and the recipient has, at times, roadblocked the correspondence.

For instance, electronic mail between a Xerox user in New York and a Wang user in San Francisco is currently impossible without expensive and complex interfacing. But in offices equipped with personal computers, which generally possess compatible protocols, correspondence can be sent fairly easily over the 3000 miles using modems and common carrier lines. Again, a printer can deliver the message in hard copy.

- United States Postal Service's Electronic Computer-Originated Mail (E-COM): Introduced on January 4 of this year, this is the latest incarnation of electronic mail. Under the E-COM system, a customer using a computer can transmit a message destined for at least 200 addresses to one of 25 serving post offices (SPOs) around the country. At the SPO the correspondence is printed, inserted into envelopes and processed as first-class mail.

Because the postal service is, by law, barred from providing the transmission lines, the messages are carried from one SPO to another by computers installed by such companies as ITT World Communications and TRT Communications Corp. Customers with personal computers can hook into lines provided by these large communications carriers, and send their mailings directly to the originating SPO.

The advantage of E-COM is that bulk mailings can simply be input into a computer once, and then the same correspondence can be mailed to over 200 locations. The disadvantage is that, in comparison to other electronic mail set-ups that transmit information from machine to machine, E-COM is a good deal slower. This is because after the letter

is sent electronically to the SPO, it is put into the common mail stream and the Postal Service is only able to promise delivery within two days.

Q: Could you please compare and contrast letter-quality printers with dot-matrix printers?

A: The bottom line? If you have to impress somebody—especially if he's Old School—your letter had better come from a letter-quality printer that uses a bell or print wheel. If you needn't impress him, a good dot-matrix is faster and less expensive. Prices run from about \$500 to \$2000 for dot-matrix printers of the type we're discussing here, and upwards of \$1500 (with one exception: the Smith-Corona just released) for the letter-quality printers.

The parts of a computer system that clack and twirl are the parts most prone to failure. Dot-matrix printers have fewer moving parts, but with either type be sure to check out reliability. You can get good letter-quality printing at dot-matrix prices with Selectric conversion kits, electronic keyboard actuators, and electronic typewriters with built in computer interfaces. Whoever gets your letter won't know the difference, but you will after manually feeding sheets into it and not being able to switch over to fanfold or roll paper for non-correspondence work. Still, it's an inexpensive solution. And it beats typing.

Q: Why is it said that financial-planning and forecasting packages offer such aid in the decision-making process?

A: Have you done financial planning? You take a big spreadsheet—sometimes a huge one—and you figure out how to organize all the money-related aspects of a given financial decision through time, and through the effects of that single decision on every other aspect of the company on which it touches.

You may have to use a number of algebraic formulas for categories of information, and, using a calculator or abacus or, heaven forbid, pencil and paper, figure out the effect your decision will have on a column of items that could stretch into the hundreds. Then you get to do it all over again for every alternative decision you could make at a given juncture.

Financial-analysis software turns your computer into a machine of consequence. Give the software your data and formulas and range of choices, and it will turn your monitor into a small window looking onto a very large electronic spreadsheet. You use the controls to move the window over the spreadsheet to look at its different parts. You use its report-generating abilities—or a related report-generating software package—to put this spreadsheet and all its permutations onto paper.

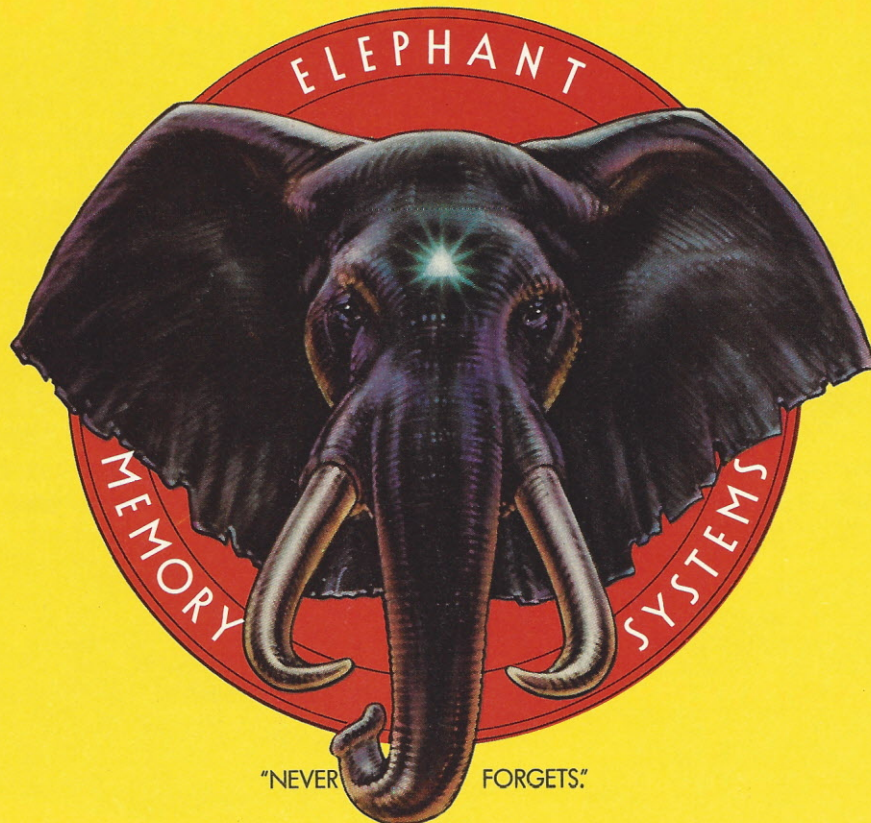
Q: How do I figure out how much RAM I really need?

A: The precise answer lies somewhere between you, your business, your computer dealer and your Maker.

A neophyte programmer generally needs 4k–16k, while home-hobby uses generally lie in the 16k–48k area. Business applications start at 48k with few exceptions, with 64k the accepted standard. Some extremely good computers are less—56k, for example—but your dealer should be prepared to explain to you why less than 64k will suffice for your applications. Professionals and managers in a single-user mode can make do with 38k–64k.

In other words, the amount of RAM needed varies with programs and usage. Word processing, very complex sorting and heavy accounting work eat the most RAM. The clearer the picture you have of how much work you will be putting through your system, the better your dealer can advise you as to how much

REMEMBER:



MORE THAN JUST ANOTHER PRETTY FACE.

Says who? Says ANSI.

Specifically, subcommittee X3B8 of the American National Standards Institute (ANSI) says so. The fact is all ElephantTM floppies meet or exceed the specs required to meet or exceed all their standards.

But just who is "subcommittee X3B8" to issue such pronouncements?

They're a group of people representing a large, well-balanced cross section of disciplines—from academia, government agencies, and the computer industry. People from places like IBM, Hewlett-Packard, 3M, Lawrence Livermore Labs, The U.S. Department of Defense, Honeywell and The Association of Computer Programmers and Analysts. In short, it's a bunch of high-caliber nitpickers whose mission, it seems, in order to make better disks for consumers, is also to

make life miserable for everyone in the disk-making business.

How? By gathering together periodically (often, one suspects, under the full moon) to concoct more and more rules to increase the quality of flexible disks. Their most recent rule book runs over 20 single-spaced pages—listing, and insisting upon—hundreds upon hundreds of standards a disk must meet in order to be blessed by ANSI. (And thereby be taken seriously by people who take disks seriously.)

In fact, if you'd like a copy of this formidable document, for free, just let us know and we'll send you one. Because once you know what it takes to make an Elephant for ANSI...

We think you'll want us to make some Elephants for you.

ELEPHANTTM HEAVY DUTY DISKS.

Distributed Exclusively by Leading Edge Products, Inc., 225 Turnpike Street, Canton, Massachusetts 02021
Call: toll-free 1-800-343-6833; or in Massachusetts call collect (617) 828-8150. Telex 951-624.

Planning Your Future Growth?

OMNINET™ Can Help You Today.

OMNINET is the first low-cost high-performance carrier-sense-multiple access local network specifically designed for microcomputers. It provides everything that Ethernet promises for mainframes, but is available now with interfaces to a wide range of popular microcomputers, including the Apple II, DEC LSI-11, and Onyx C-8000.

OMNINET uses low-cost, easy-to-install twisted pair wire that makes installing and adding new computers as simple as hooking up stereo speakers. You can connect up to 64 different computers and peripherals in a high performance one megabit per second network with a total length of many thousands of feet. Micro-computer-based intelligent transporters in each computer manage total network operations without stealing processing power or requiring significant software support from the host.

Corvus has helped you expand your personal computer into a powerful business tool with mass storage, low cost backup, and data sharing. Now, we give you an intelligent solution to your local communications needs. With OMNINET's microvirtual circuits, you can accomplish direct intercomputer communications with your microcomputers, a thing that was only dreamed of on mainframes yesterday. Contact your Corvus dealer now for full details.

★ ★ **CORVUS SYSTEMS**
★ ★ 2029 O'Toole Avenue
★ ★ San Jose, California 95131
408/946-7700 TWX: 910-338-0226





LET US HELP YOU MAKE MONEY

TAX PREPARER by HowardSoft:

A package for year-long record-keeping and year-end tax filing; prepares returns for several forms & all schedules using on-screen facsimiles; prints in IRS format for filing; buy now and purchase low-cost updates at year end.

CREATIVE FINANCING by HowardSoft:

A flexible package for evaluating real-life loans & investments; provides cash flow & R-O-I projections as well as payment tables and objective decisions; can be used to determine yield to maturity of discounted bonds, present value of annuities stream, buy vs. lease decisions, APR of loans including wraparounds and analyses of all new loan types.

REAL ESTATE ANALYZER by HowardSoft:

A tool for objectively comparing alternative investments and projecting future results; professional in both analyses of cash flow & R-O-I and client-oriented report printouts; allows what-if studies for changes in property values, loans, rents, taxes, operating expenses and the value of money; perfect for cash and profit projections on new or old rental property.

NOW AT YOUR LOCAL DEALER



Howard Software Services

...for the SERIOUS Personal Computer User

8008 Girard Ave., Suite 310 | La Jolla, CA 92037 | (714) 454-5079

CIRCLE 28

CHANGING ADDRESS?

If you're planning to move, please let us know at least six weeks before changing your address. For fastest service, attach your current mailing label and fill in your name and new address in the space provided. This will insure accurate and prompt service on your subscription.

Name _____
New Address _____
City _____ State _____

Send old label with your
name and new address to:

PERSONAL COMPUTING
4 Disk Drive
Box 1408
Riverton, N.J. 08077

ANSWERS

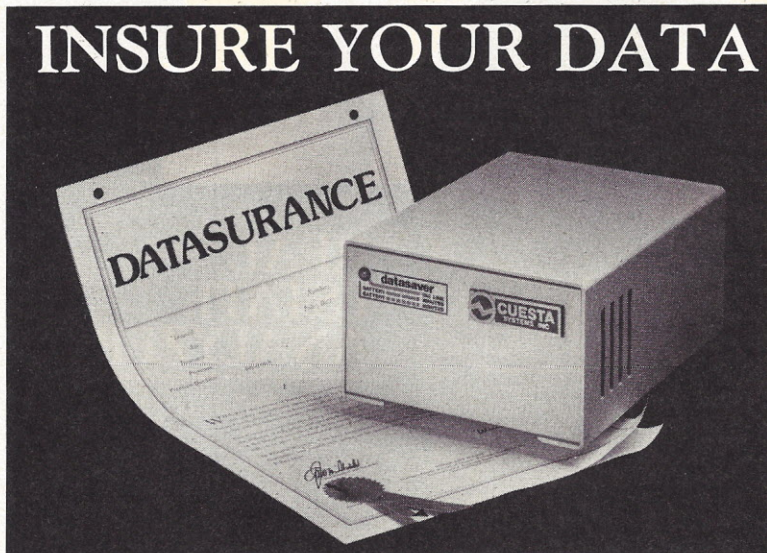
you need. And remember, most computers' RAMs are expandable. Make sure that the software you're using, by the way, can get to the RAM, or you could be buying nothing but a larger electricity bill.

Q: If I don't know much about operating systems, am I in any way robbing myself of increased personal productivity?

A: Far more has been said about operating systems than most users need to know. Essentially, operating systems are software that serve to connect your hardware to your applications software packages. Good ones should do their jobs like great butlers—so surreptitiously that they border on invisible. There is a trend toward operating systems that allows software packages portability—the ability to run on a variety of hardware. Pray for the success of this trend, because it will mean software houses could produce their packages in large enough numbers to bring prices down to mass-market levels.

You shouldn't have to know much at all about the operating systems your computer uses, beyond making sure they support the software packages you want to run and that the major software houses are using the systems.

One note of caution, though: Just because your computer has a CP/M operating system, for instance, it doesn't automatically mean that you can buy any software written in CP/M for your machine. It has to be configured to match the idiosyncrasies of your hardware, such as screen width and disk format. This can usually be done but you can't take it for granted. When a salesman touts the hundreds of applications packages you can buy for his Brand X machine, ask him which of these he can supply you with—today—that are properly configured to it. You might be surprised by the answer. And in some salesmen's versions of English, "soon" could mean a year. 



With Back-up Power for Business, Personal Microcomputers.

Like a good insurance policy, DATASAVTM safeguards both the time invested and the data contained in your system by protecting your computer against unexpected power failures, brownouts, or other line disturbances.

DATASAV provides up to 90 watts of continuous power during short-term interruptions, (2-5 minutes at full power, 15 minutes at half power) ... enough time to close out files and shut down the system if the power loss continues.

DATASAV comes complete with rechargeable sealed battery, automatic battery charger, solid state power inverter, AC line voltage monitor and cutout switch, front panel status LED, and an audible alarm buzzer.

You owe it to yourself to check out "DATASAV." See the DATASAV at your local dealer or call/write for additional information:



**CUESTA SYSTEMS
INCORPORATED**

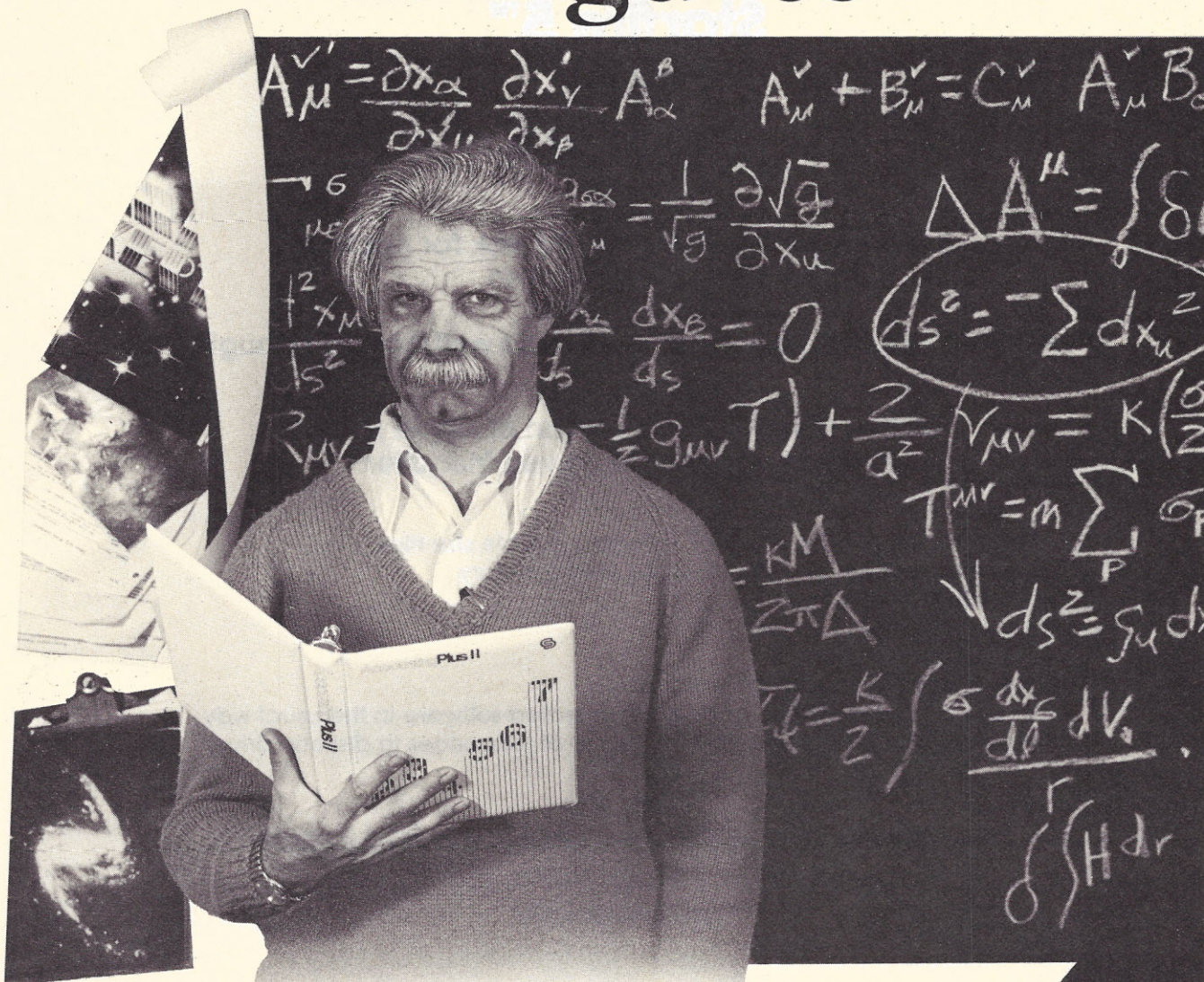
3440 Roberto Court,
San Luis Obispo, CA 93401
(805) 541-4160

DEALERS ... find out how easy it is to become a DATASAV Dealer. Ask for a free Dealer Kit.

CIRCLE 45

Accounting Plus II

It Figures



It figures that the same people who brought you Accounting Plus* on the larger computer systems wouldn't forget the Apple.** Accounting Plus II brings to the Apple Computer a completely integrated, easy to use accounting system. Accounting Plus II doesn't require any special hardware, only 48K of RAM and two floppy drives or hard disk, and you don't have to be a CPA to use it. Accounting Plus II organizes and streamlines your paper flow and generates checks, invoices, statements and purchase orders on pre-printed forms. The system supports a solid audit trail which your business requires and your accountant demands.

Modules now available:

- General Ledger
- Accounts Receivable
- Accounts Payable
- Inventory with purchasing

For additional information call or write
Systems Plus Inc., 3975 East Bayshore,
Palo Alto, CA 94303 Phone 415/969/7047

Seeing is believing.

Systems Plus



*TM of Software Dimensions, San Jose, CA

**TM of Apple Computers, Cupertino, CA

BIRTH OF A STAR

Starfire 5™ from CORONA

**5 Megabyte Winchester hard disk for Apple II
\$2995, ready-to-use**

The only one

For ONLY Apple II, so you can be sure it's well thought through

The only one

**With a true hard disk version of Apple DOS
To make your Apple II even friendlier:**

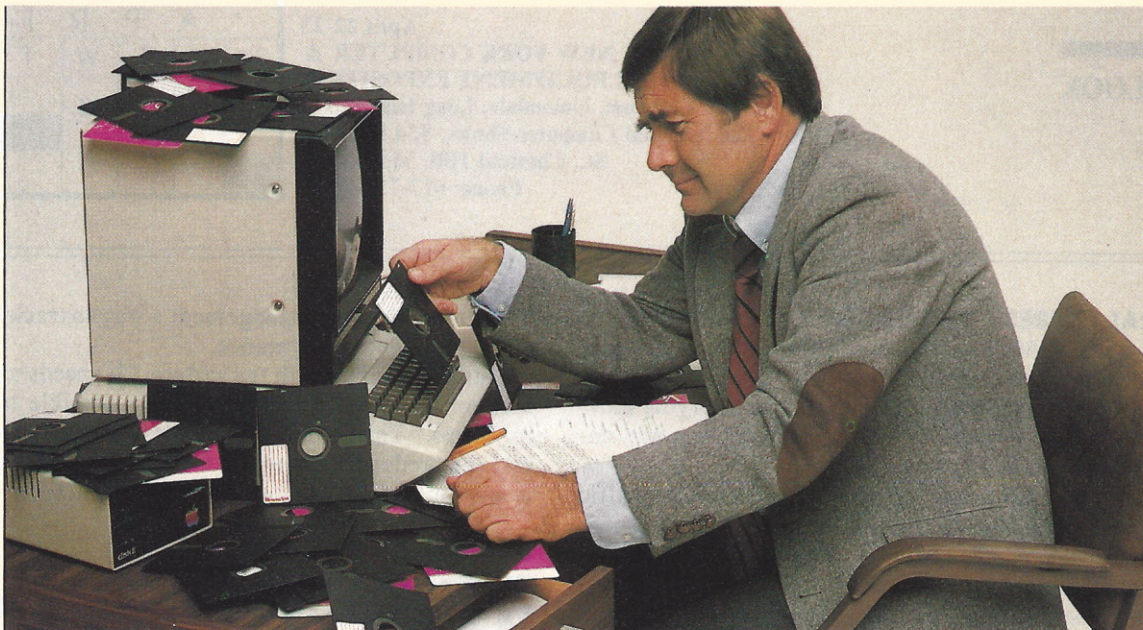
- Double size volumes optional, allowing double size files
- Named volumes and complete volume directory
- Search disk for a file
- Boot to any file in any volume
- Fast backup utility
- Single keystroke program execution
- Allows booting VisiCalc and other protected software in the usual way
- Allows automatic channeling to Starfire of references to diskette drives

and with

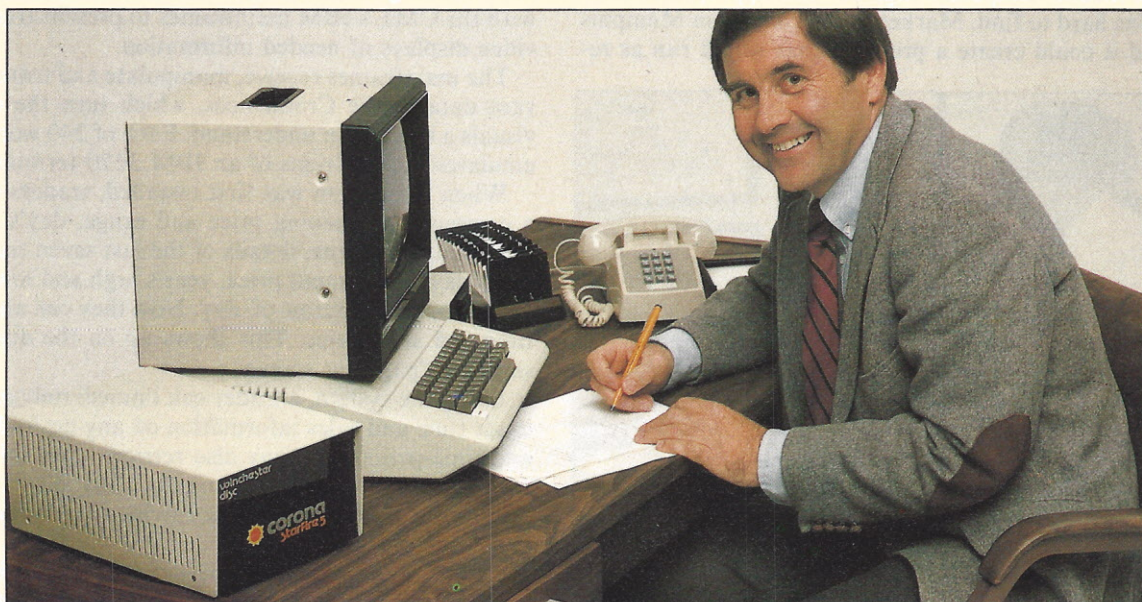
**DataGuard automatic data protection (32-bit ECC)
Optional CP/M, Pascal, Nestar cluster, and
1 year warranty**

Starfire 5 The only one

Apple II is a registered trademark of Apple Computer, Inc.
VisiCalc is a trademark of Personal Software Inc.
CP/M is a registered trademark of Digital Research, Inc.



Starfire 5. The disk drive that won't play hide-and-seek.



What do we mean by that?

You chose the Apple II, and it's a good computer choice.

But Apple diskette drives play hide-and-seek with your valuable data.

And if you're not looking for a diskette, you're worrying about scratching one.

Besides, they're just too slow and hold too little.

That's why your Apple II needs a REAL business partner.

Like Starfire 5, the 5 Megabyte Winchester disk from Corona.

The one that holds 38 diskettes of data, available instantly, and can alphabetize a mailing list 5 to 10 times faster.

The one that seals your data off from danger and insures it with DataGuard automatic data protection.

Double-volume data files.

And best of all, Starfire 5 lets your files be twice as long, beating a crucial limitation of Apple's disk operating system, without abandoning it.

That's the kind of partner your Apple II needs to let it fulfill its computer promise.

At \$2995, it's quite a deal.

So ask your dealer to show you Starfire 5 from Corona.

Or call us for the local dealer who can.

Because Starfire 5 is the BUSINESS partner for your Apple II.



213-998-0505

21541 Nordhoff St., Unit B, Chatsworth, CA 91311

OUTLOOK

April 22-25
NEW YORK COMPUTER &
OFFICE EQUIPMENT EXPOSITION
Nassau Coliseum, Uniondale, Long Island, NY.
The National Computer Shows, 824 Boylston
St., Chestnut Hill, MA 02167.
Phone: 617-739-2000.

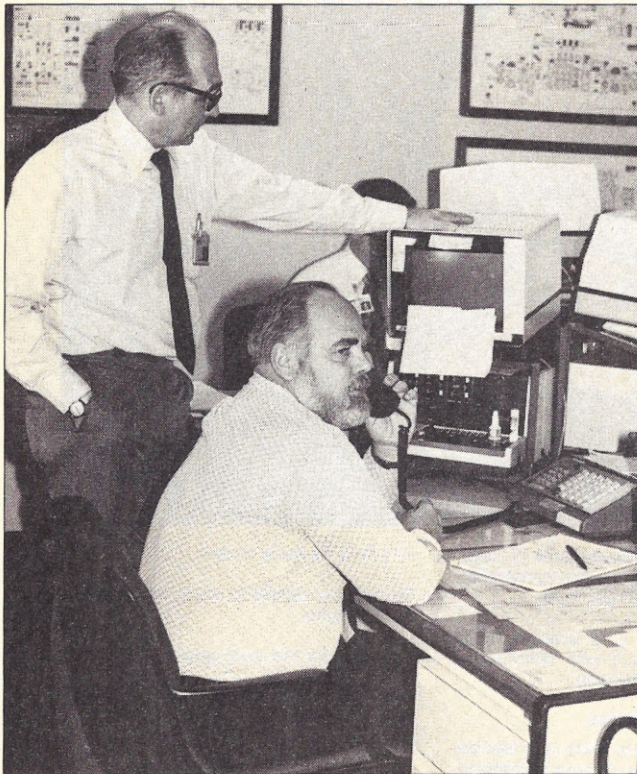
A P R I L						
S	M	T	W	T	F	S
				22		
25						

FEDERAL EXPRESS FLIES THE GRAVEYARD SHIFT

It's 3 a.m. at Memphis airport and scores of compact business jets are taking off, winging towards 70 different cities around the country. They are not carrying movers and shakers, though. They're carrying boxes and envelopes for Federal Express.

Before any flight can roll down the runway, traffic managers must know the flight's aircraft and crew scheduling, system control, container weight and input, and fueling and flight-crew assignments. When Federal Express was coordinating 16,000 packages per day in 1973, this could be done with telephone, paper and pencil. At 70,000 packages per day in 1980, something new had to be tried.

That meant computerizing, but the appropriate software was hard to find. Market Data Systems in Memphis claimed it could create a program that would run as re-



liably as the company's mainframe, and less expensively. Federal Express took MDS up on its offer and it worked, according to James M. Dunkel, MDS' Director of System Control.

Now MDS has over 20 input stations with over 39 monitors, which are run by two Cromemco Z-2H's and two multiplexers. After each entry, the computer verifies it for accuracy and checks to see that it is being presented on schedule. It is also stamped with the time it is reported.

This gives company management a way to track employee and equipment performance.

Dunkel is happy with the system. "It speeds up communications and allows us to identify possible scheduling problems." The system gets the jets down the runway and into the predawn darkness. And by anticipating problems, it lets Dunkel's people act instead of react.

COMPUTERS FLOOR THE COMMODITIES EXCHANGE

Pry up the floorboards of the Chicago Mercantile Exchange (CME) and you'll find personal computers. Some of the world's commodities traders make or break their volatile fortunes above 30 Cromemco Z-2H computers humming in the darkness. These computers interact with the CME's IBM mainframes to present traders with video displays of needed information.

The mainframes receive, manipulate and transmit relevant data to the Cromemcos, which turn the data into visuals a trader can understand. Each of 240 workstations emulates the functions of an IBM 3270 terminal.

When the system was first installed, traders could get a commodity's opening price and range, day's high and low, trading volume, details of the last seven trades, previous day's settlement price, year's high and low, current time-bracket, and time of day. Now they can also display time and sales price. This shows up on the display as a separate "page" or screen.

Using the system, a trader can immediately call up the exact time and sales information on any desired contract and time-period. He may also retrieve sales information with simple keyboard commands. Any display can be printed out, and each printout carries an identifying number specific to that broker.

Although the system was designed for expansion, it was hard to fit the setup into a building whose architects could not have envisioned its use. So the computers went in under the floorboards and the display terminals were custom-designed to fit into the workstations' dimensions.

GO AHEAD AND TOUCH IT

In answer to the growing need for information and education on the use of electronic products in the home and in business, the Texas Instruments Learning Center facility has opened at the Business Products Center of the Merchandise Mart in Chicago, Ill.

The TI Learning Center offers a broad range of seminars, lectures, workshops, demonstrations and videotape courses on TI electronic products and their applications. All products are set up and ready for a "hands-on" tryout by visitors, with the Learning Center staff available for questions.

To meet the needs of as many people as possible, activities take place not only at the center itself, but also in a

INTRODUCING PERFECT WRITER. NOW, GET THE FINEST WORD PROCESSOR AT ANY PRICE FOR JUST \$289.00

AND GET OUR INCREDIBLE, MONEY-BACK GUARANTEE!

That's right. If you own an Apple II, Heath/Zenith, TRS-80 model II, North Star, Osborne I, Superbrain, Micropolis/Vector, or CP/M 8", you can now afford the most advanced, yet easy-to-use, word processor on the market today.

But don't take our word for it. See for yourself.

We're so sure you'll be amazed by Perfect Writer's easy-to-use features and capabilities, that we'll let you try it for thirty days and give you your money back if you're not completely satisfied!

FEATURES AND FLEXIBILITY YOU HAVE TO SEE TO BELIEVE.

Looking for the advanced features you'd expect to find in the most expensive word processors? Perfect Writer has them. Like automatic formatting of letters, out-lines, reports, memoranda, articles, books, or other types of documents.

What makes Perfect Writer unique, are the features you won't find in word processors costing many times its price.

Like the incredible sophistication of Virtual Memory Architecture, that lets you edit a full-length novel as easily as you'd edit a letter.

Or a remarkable breakthrough called Split Screen Editing™ that lets you divide the screen into two parts, each showing a different document, and transfer sections of text between the two!

And that's just the beginning. Perfect Writer offers much, much more:

- Automatic numbering of pages, chapters, sections, footnotes, internal page references, and automatic generation of table of contents and indexes.
- Mail merging capability allows generation of form letters and more.
- Automatic carriage return, auto-centering, tab setting, and automatic placement of footnotes.
- Quick and easy cursor commands.
- Easy deleting and inserting procedures.
- Safe and convenient storage of materials.
- Searches for and replaces words and phrases in a document, including near misses.
- Full range of printing options, including right margin justification, micro-spacing, super and subscripts, italics, and bold face.
- And lots more.



Perfect Writer.
The remarkable word processor
combining sophistication and
simplicity.

MONEY BACK GUARANTEE.

Try Perfect Writer for 30 days at our risk. If you're not completely satisfied, return it for a prompt, complete refund.

PERFECT WRITER IS EASY TO USE. WE GUARANTEE IT.

When we say that Perfect Writer is easy to use, we mean it. That's why we're not afraid to offer a money back guarantee.

You see, Perfect Writer was designed to be simple. In fact, you don't even have to read our crystal-clear manual in order to use Perfect Writer. The pictures, diagrams and illustrations tell you all you need to know, so you're off and running in no time.

There are no difficult and awkward procedures and commands to learn. We guarantee it.

ORDER NOW. WHAT HAVE YOU GOT TO LOSE?

If you'd like to own the most sophisticated word processor on the market today at the current, introductory price of just \$289.00, we invite you to order now.

Perfect Writer is completely guaranteed, so there's no risk of any kind. Why not see for yourself what this incredible new software breakthrough can do for you?

TO ORDER CALL TOLL FREE: 1-800-221-2486
IN NEW YORK CALL: 1-212-619-4000

WRITE: COMPUTER SERVICES CORPORATION OF AMERICA
71 MURRAY STREET
NEW YORK, NEW YORK 10007

Yes, I want to see for myself if Perfect Writer is as great as you say it is. So please send it to me, subject to the guarantee printed on this page.

☐ Perfect Writer and Manual \$289.00

I also want to order, subject to the same guarantee:

☐ Perfect Speller \$189.00

☐ Perfect Sort \$189.00

☐ Perfect Mailer \$189.00

Name

Address

City, State, Zip

☐ MasterCard



☐ American Express



☐ Visa



Number Expires

TRY THESE OTHER PERFECT SOFTWARE PRODUCTS

(THE SAME MONEY BACK GUARANTEE APPLIES).

Perfect Speller™: The best automatic proofreader available! Perfect Speller uses its 20,000 word dictionary to proofread your document and catch all your spelling mistakes. (Dictionary size limited only by your system's storage capacity.) You can add words to the dictionary, build separate dictionaries, change the dictionary, and more. \$189.00 guaranteed.

Perfect Mailer™: It's more than a mail merging or form maintenance system! Perfect Mailer can organize and sort your correspondence, develop sophisticated mailing systems, and keep track of your correspondence. Don't miss this remarkable new software innovation! \$189.00 guaranteed.

Perfect Sort™: Here's a sort/merge/extract program that operates on all kinds of data! Records can be fixed or variable, with a variety of variable length fields. Files can be examined using comparison and logical operators. Want speed and efficiency? You've got to have Perfect Sort! \$189.00 guaranteed.

© 1982 Computer Services Corporation of America

CONGLOMERATES COLLIDE

Take the Helm and Venture into a World of Finance and Fortune.

Lead your company into battle against large Multi-National Corporations to become "Chairman of the Board". The struggle begins as you maneuver to acquire growth companies, handle bankers and deal in world markets seeking to build the value of your company. From Decision Central, you are on-line to 5 corporate data banks for ready access to information vital to company-wide operations.

High technology breakthroughs, tariffs and contract awards are just a few of the Global News Events that will be reported to World Headquarters. RockRoy's exclusive color line graphs (illustrated) and dynamic Hi-Res graphics add a new dimension to strategy play. Easy to learn rules and 3 different game play options: solitaire, 2-4 players or multiple computer opponents. For high scoring "Chairmen of the Board" each game disk comes with 3 entries to the RockRoy Competition.

CONGLOMERATES COLLIDE™ is educational gameware designed to remain a classic in your software library for years to come.

For your Apple® (48K, Disk with Applesoft in ROM)

Visit your local dealer today. To order by mail send your check to RockRoy. VISA and M/C holders call Toll-Free 800-528-2361. In AZ 998-1577 • \$39.95 includes shipping and handling • 15 day money back guarantee.

ROCKROY INC.

7721 E. Gray Road, Suite 103
Scottsdale, Arizona 85260

Toll-Free 800-528-2361



The progress of up to four competitors is instantly charted by RockRoy's exclusive color line graphs.

CIRCLE 11

Apple is a registered trademark of Apple Computer, Inc.

Conglomerates Collide is a trademark of RockRoy, Inc.

OUTLOOK

network of schools, corporations and other institutions and facilities in the greater Chicago area. Some of the educational services are free; others carry a nominal tuition.

In addition, the Learning Center offers a variety of books, manuals, literature and software, as well as a variety of accessories for TI electronic products such as batteries, power packs, thermal paper and cables.

The Learning Center facility houses TI's line of DS990 commercial computer systems and software packages, as



Hands-on experience is available at the new Texas Instruments Learning Center in Chicago.

well as the TI-99/4A Home Computer; various programmable, professional and business calculators; and a number of electronic learning aids. A variety of product demonstrations also take place, and a drawing for a TI-99/4A Home Computer is held daily for visitors who register at the TI facility.

The Chicago Learning Center is TI's response to the problem of marketing affordable, yet complex electronic products. According to Charles M. Clough, vice president of corporate marketing at TI, "With the millions of people who can now afford to buy computing and calculating products, there's a clear need for a cost-effective way for TI to reach out directly to end users with in-depth product information and training."

SOFTWARE SCARCITY IN THE 1980s?

"Finding reliable software for small-business computers—both minis and personal computers—will be more of a problem for users in the early 1980s than finding hardware," says Ruth Koolish, *(continued on page 125)*

Unwrap the Crypto Mystery for \$495.

Thanks to the Western Digital CryptoPrimer™

Development Kit, cryptography is no longer a deep, dark secret. In fact, the kit is specially

designed for personal computer owners and is based on the National Bureau of Standards' data encryption algorithm. Included in the kit are: a CryptoPrimer™ manual, a cryptographic system built around our

WD 2001/2 data encryption chip, a convenient RS 232 connector and a special

hardware manual. All for just \$495. Best of all, you'll end up with more than a clue on how to implement all the benefits of data encryption. So send your check or money order (including \$9.00 for shipping and 6% sales tax if you're a California resident) to: Western Digital, 2445 McCabe Way, Irvine, CA 92714. Please also specify your computer's make and model number.

We think keeping cryptography a mystery is a crime.

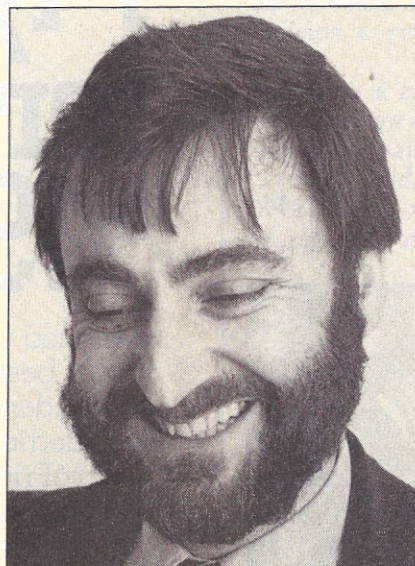
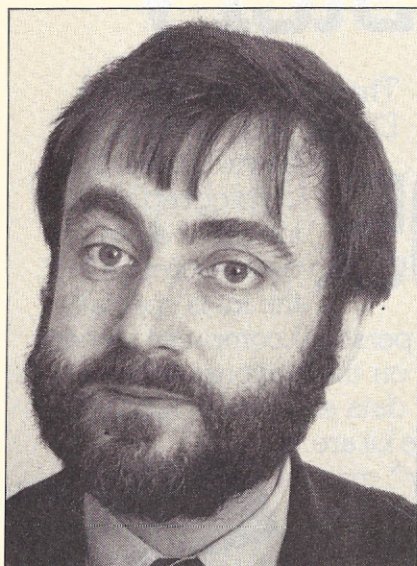


Making the leading edge work for you.

WESTERN DIGITAL
C O R P O R A T I O N

Telecommunications Division
2445 McCabe Way, Irvine, CA 92714
(714) 557-3550

CIRCLE 41
April 1982 PERSONAL COMPUTING 21



photos by Steven Mark Needham

A PERSONAL COMPUTING Interview With Tony Gold

And where would we all be without software?

A native of Wembley, England, Tony Gold, asked himself this question in the late 70s. His answer? The formation of Lifeboat Associates, a software publishing and distributing firm.

Along with one-time computer hobbyist Larry Alkoff, Gold succeeded in building a company from a drab New York City basement operation into a \$10 million concern. And over the same years he has also managed to achieve something of guru stature in the personal-computing community. He is frequently credited with being the driving force behind making CP/M 80 an industry standard.

PERSONAL COMPUTING: How do you define "personal computer?"

Gold: It's a computer which is on a one-to-one, machine-to-person basis. Someone has his hands around the machine. He owns the machines' resources. He can put the diskettes in

his pocket and take them home.

PERSONAL COMPUTING: From the software vantage point, who is using personal computers?

Gold: There are 4 major kinds of personal computer users. The first is what we would call the professional—the knowledge worker—the person who's doing some kind of analysis. He might be doing some engineering calculations, or some research. His work might be technical or it might be commercial. But he is essentially a professional individual.

The next classification is what I would call the "transaction-process group." This person might be involved in mail-list work or accounting. He might be in a small business—like a stock broker or doctor. The transaction processing is what defines these people. They can't run the accounts receivable or the mail list or the general ledger of a large corporation. The other two segments of personal-computer usage

are home computing and education.

PERSONAL COMPUTING: Is Lifeboat involved in all these markets?

Gold: We have not in any way entered the educational markets or the home-computer market.

PERSONAL COMPUTING: Why is that?

Gold: Education is not a well funded industry at this point. We're a small company. We don't have an economic-forecasting department. We have casually sold to higher-education levels and we found that it is an industry that is consistently slow in paying. It's one thing to sell to the University of New York, it's another thing to get paid by the University of New York.

PERSONAL COMPUTING: So you have them on your accounts receivable?

Gold: In terms of credit they are obviously going to pay. They don't deny they're going to pay, I just wish they could pay us more quickly. Anyway, my view of personal computing seems to be forced into those four segments and my vote essen-

☐ **Yes.**

I want to turn my microcomputer into a powerful information and communications system. Send me your free Information Kit.

☐ **No.**

Thanks anyway, I'm already on-line with THE SOURCE.SM

If you are not one of the more than 11,000 microcomputer, data terminal or communicating word processor owners who already subscribe to The Source, send in this coupon or call us toll-free. We will send you our free Information Kit that describes the over 1200 programs and services now available from The Source. You'll see how easy it is to turn your microcomputer into a powerful information and communications system.

With TheSource, you get hundreds of useful services for the home or for helping you run your business more profitably. You can get current stock prices, make airline reservations, find a good restaurant, barter goods and services, get up-to-the-minute sports and news from UPI. You can communicate instantly through electronic mail with branch offices and field representatives subscribing to The Source; you can create your own business programs, on either a simple or sophisticated level.

In addition to all this, you also have access to hundreds of easy-to-use data bases, electronic games, informative and educational

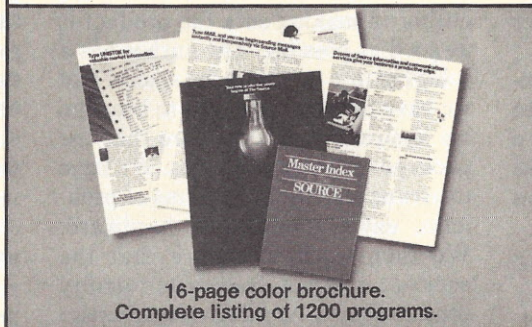
programs (including lessons in geometry and spelling, foreign language drills and math reviews), and a unique shop-at-home service that lets you buy over 30,000 brand name

items at discount prices.

You can do all of this easily and inexpensively with a local phone call in more than 350 cities across the country, and at a one-time subscription fee of only \$100.00 and usage costs as low as \$4.25/hour.

If you'd like to get the most out of your personal computer or data terminal, call our toll-free number or send for your free kit today.

**For free Information Kit
call toll free 1-800-323-1718.**



16-page color brochure.
Complete listing of 1200 programs.

You have nothing to lose and a world of information to gain.

Mail to:

**Source Telecomputing Corporation, Dept. (16M)
1616 Anderson Road, McLean, VA. 22102.**

Name

Company

Address

City State Zip

Telephone ()

Type of Equipment

THE SOURCE
AMERICA'S INFORMATION UTILITY

The Source is a servicemark of Source Telecomputing Corporation, a subsidiary of The Reader's Digest Association, Inc.

INTERVIEW

tially has mainstreamed in the first two.

PERSONAL COMPUTING: Lifeboat started in 1977. That's about when Apple was starting.

Gold: That's an interesting point that we might have started at the same place. It's also interesting that we do very little if any Apple Software. But I had actually begun the software distribution about a year earlier.

PERSONAL COMPUTING: Could you give us some insight on the founding of Lifeboat?

Gold: Through my interest in computers I met Larry Alkoff, a computer hobbyist. We decided to organize an information-sharing group for people who used CP/M 80 operating systems. In 1977 we launched Lifeboat, which we structured as a one-stop source for micro-computer software packages configured for CP/M 80, SB80, and other compatible systems.

Actually, we started in the basement of a New York apartment building, dubbed the "Dungeon." We grew in quantum leaps and by 1980 we were occupying nearly two floors on 3rd Avenue.

PERSONAL COMPUTING: What are your current annual sales?

Gold: Estimated at \$10 million.

PERSONAL COMPUTING: How would you categorize your company? Are you a software publisher or a software distributor?

Gold: We do software engineering on contracts for computer manufacturers. We do operating systems and installation of systems software for computer manufacturers. We also are software distributors and publishers.

PERSONAL COMPUTING: The difference being...?

Gold: When we are the publisher we have an exclusive right to distribute and we also have a prime responsibility for merchandising, advertising and pricing. Where we function as distributor we are essen-

tially carrying a product on a non-exclusive basis to compliment our product line.

If we are the publisher, we are also the distributor, but the reverse is not always the case. We distribute software products of, say, Microsoft, Micropro and Digital Research on a non-exclusive basis because those are essentially well-written packages that compliment our product line. But the ones that we obviously invest a great deal of time and effort in in terms of promotion, advertising and marketing and such would be other packages.

PERSONAL COMPUTING: You are the publisher of T-maker?

Gold: Yes. We don't own it, but we are the publisher. It's a very similar relationship to that of the classic publishing relationship. We perform an editorial function. We work with the author in making sure the product is as good as possible. The author has a solution to a problem he's seen and we have to work with him to broaden his horizons and make sure that the package addresses all areas. We have to arrange solutions in terms of problems, environments and hardware. We then work to ensure that the package is as bug-free as our quality control allows. And then we advertise and promote.

PERSONAL COMPUTING: How would you describe your overall business plan?

Gold: The major thrust of our business plan is to certainly view this product line as existing on a three-dimensional axis. One of the axes is the machine, another is the software products by name and the third axis is geographical territory. So at this point we're supporting well over a 100 packages. We're supporting probably 50 or 75 different computer manufacturers with a wide variety of computers. And we're supporting it on three continents. And that's essentially where our 8-bit product counts. It's been based upon the concept of

portable software and the idea of allowing the operating system to perform what we call the bus. We coined a phrase "software bus."

PERSONAL COMPUTING: What does that term signify?

Gold: We're essentially looking at the software as a software bus, which allows a single engineering accomplishment of installing an operating system that allows the easy end-user installation of a wide variety of application and software tools.

PERSONAL COMPUTING: And that's where the 8-bit product lies?

Gold: Yes, and the 16-bit product line is now coming together in more than one direction. One of the most important of these directions is with the IBM operating system which IBM calls DOS. This is going to form the basis of our next generation of product.

PERSONAL COMPUTING: Do you use a personal computer yourself?

Gold: Yes.

PERSONAL COMPUTING: What do you do with it?

Gold: Word processing, natural analysis, and accounting are the first three areas.

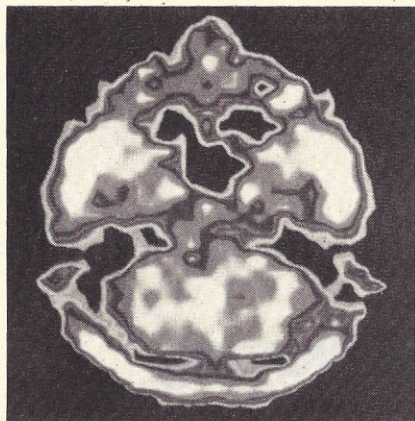
PERSONAL COMPUTING: So you were really a pioneer in this whole business and you're still using a personal computer to increase your own personal productivity?

Gold: Absolutely. Certainly when it comes to personal productivity there's no alternative to a personal computer.

PERSONAL COMPUTING: What would you recommend as the route to follow for the person who wants to purchase a personal computer and thereby increase his personal productivity?

Gold: It all depends on what you want to do with the machine, not only today but over the life expectancy of the machine. What do you want to achieve with your personal computer over the next few

(continued on page 157)



*This spring, you could learn about
new products and processes that will make
some people very rich.*

Here's one. It's called nuclear magnetic resonance. It's the basis of a non-invasive imaging device that can actually "see" inside everything from the human

body to plant machinery. Next year it will make headlines. But you can learn all about it now in TECHNOLOGY magazine.

NUCLEAR MAGNETIC RESONANCE IMAGE OF HUMAN HEAD.

ANNOUNCING TECHNOLOGY MAGAZINE

You can sample an issue FREE

Technology. It's probably the toughest free enterprise arena in the world. You either win or lose... seize opportunities or face obsolescence.

And, to stay competitive, you've got to stay on top of all the new developments. Know when to commit to a new process or application... and when you'd be smarter to lay back and learn from someone else's mistakes.

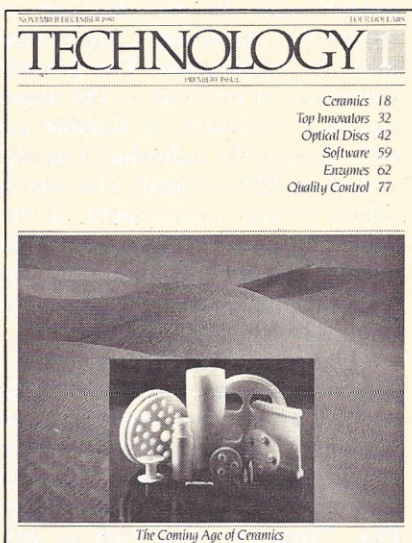
And now there's a magazine that gives you, all in one place, the vital intelligence you need to make those decisions.

TECHNOLOGY. A new kind of magazine that lets you peek into R & D labs around the world. So you can learn what's working. What's not. And what's the coming state-of-the-art in everything from ceramics that can replace metals and plastics to enzymes that could provide a bio-industrial alternative to high priced petroleum.

You won't read TECHNOLOGY. You'll use it!

While TECHNOLOGY is edited to deliver the most information in the most accessible style — and is a joy to read — it is not intended for the hobbyist or the merely curious.

It is a *tool* to be used by people who have a tangible stake in technology. Each major article appears in a unique 5-part format consisting of a general interest overview, a business outlook report, a core article for professionals and specialists, an applications side bar, and



an extensive bibliography. You'll see quickly and precisely...

- How a specific technology originated and in response to what needs
- How it works
- Its potential uses and limitations
- Who (and where) the experts are
- What applications are practical right now and what they cost
- How it fits or connects with other techniques, methods, processes and systems

To find out everything you need, you could comb through the dozens of

magazines, trade journals, and newsletters on the subject of technology — at considerable time and expense.

Or you can subscribe to TECHNOLOGY and hook into one of the most extensive networks of information and technological expertise ever assembled. So that whether you are a technology executive, a specialist seeking new breakthroughs, an entrepreneur or investor... TECHNOLOGY will bring you the information you need — ahead of the crowd. So you can act on it profitably.

Get your first issue FREE!

TECHNOLOGY is available only by subscription — it is not sold on newsstands.

But you can receive your Charter issue FREE simply by returning the accompanying card or the coupon below.

We'll send you TECHNOLOGY for a free examination... and reserve a Charter Subscription in your name at the special rate of only \$18 for 1 year (that's 6 bi-monthly issues at a saving of \$6 off the regular yearly rate). If, after evaluating your first issue, you don't wish to continue, just write "cancel" on your bill and mail it back. You'll owe nothing and may keep your first issue with our compliments.

Return the coupon below or the accompanying card to receive your Charter issue FREE!

Send my
Charter Issue of
TECHNOLOGY
FREE

And enter my 1-year Charter Subscription (6 bi-monthly issues) for only \$18... a \$6 saving off the regular subscription rate. I understand that if I'm not satisfied with my first issue, I need only write "cancel" on my bill. I may keep my issue of TECHNOLOGY and I'll owe nothing. Otherwise, I'll return your invoice with payment and receive 5 more issues.

Name _____ (PLEASE PRINT)

Address _____

City _____

State _____ Zip _____

Get Ready For Prime-Time Playing

Time: the present. Lights rise center stage on personal computer. Background shadow cast by mainframe. Enter stage left: American industry

by Jeffrey Rothfeder

Five years ago a debate over the difference between a personal computer and an institutional computer, one that solely serves the needs of the corporation rather than the individual, could have been dismissed as merely a matter of semantics. At that time, with personal computers still a novelty, few would take the side in an argument that this new machine would soon become a significant linchpin in this country's transition into the 21st century.

But that attitude is changing now as the distinction between the two computers is becoming meaningful. In fact, it is so meaningful that the personal computer, because of the way it differs from the institutional machine, is now catalyzing an overhaul in this country's work habits and life-styles.

In sorting out the difference between the two kinds of machines, most describe it in terms of individual control over the computer as opposed to computer control over the individual.

"An organizational computer does the work of the organization," says Don Williams at Apple Computer. "And that almost automatically implies a rash of procedures, policies and formats already in place, developed and determined by data-processing professionals. On the other hand, the type of work the per-

sonal computer does is solely dependent upon the individual job and the needs of the person using it rather than the corporation. The personal computer, in contrast to the organizational computer, is flexible and will adapt to the individual's needs."

And an IBM official, who was involved in the development of that firm's Personal Computer, adds that it is the machine's flexibility that also makes the personal computer a fulcrum for increased creativity.

"The personal computer allows a person to be more productive and creative at his own speed and convenience," says Philip D. (Don) Estridge, head of IBM Personal Computer operations in Boca Raton, Fla. "Indeed—and this is very important—a personal computer helps an individual create and understand information."

Struggle for control

At the core of the argument is mastery over information—its flow, its reception and its use. On the business level, tightly held information networks, grabbed years earlier and nurtured since then by data-processing departments, are being chipped away at by company personal-computer users, and battle lines are being drawn.

Personal-computer converts claim that their management potential and the efficient handling of their departments are hampered every time they have to swim through corporate channels to reach the magical data that mainframes possess. Data-processing chiefs counter that unless

there is centralized control over the company's information, some of it will get into the wrong hands, some of it will be used incorrectly, and, perhaps worst of all, each department will spew out different information that fails to conform to dictates.

The bottom line is, of course, profits. And if users' tales of improved employee habits and work styles and impressive dollar savings are even partially accurate, the smaller machines are rapidly gaining on their larger competitors.

One story that appears to concretize the issue is related by a former vice president of marketing at a Fortune 1500 company. Recalling his first day on a new job a few years back, he tells of sitting at his empty desk acclimating himself to his office, when his secretary walked in, lugging a 12-inch-thick stack of computer printouts. She told him it was the daily sales report.

"The form of the printout was useless and unintelligible for my purposes," the former marketing vice president says. "It was designed to serve the needs of the data-processing department, not market analysis. I politely told my secretary to never darken my office door with that printout again."

False hopes

After asking through the chain of command at the corporation for a system of computerized output that would be useful to him, the marketing vice president was put face-to-face with the firm's data-processing chiefs. A meeting was called to

Jeffrey Rothfeder's articles appear in major newspapers, such as The New York Times and Washington Post. He is Associate Editor of Personal Computing.

"The data-processing profession was formerly the high priesthood of computer power and held the keys to the sanctuary."

come up with a marketing and sales-analysis reporting plan that would better suit the vice president's needs. He remembers being encouraged by the discussion. "I really thought they understood what I wanted," he says.

And when the dp executives got back to him, it was to offer what was to them good news—but to the marketing vice president, it turned out to be a setback. They told him that they had drawn up his plan in proposal form and that it would be introduced at the next corporate data-processing meeting—in approximately two months. After that, if the system is given priority approval, the software will be developed, kinks will be smoothed out, hundreds of man-hours will be put in, and the program will finally be on-line. But when the vice president left the company 20 months later, there was still no program in operation.

"If I had a personal computer, it still would have required an investment of time to work out a system—though not as long as the corporation was taking—but at least I would have been in control of its development," the former marketing vice president says. "Decisions about the computer and its output would have been in my hands rather than in the hands of the corporation."

"The crucial question—what if I want information in different form than the dp manager has deemed necessary?—is one you can't ask easily when you're working under the rules of the corporate mainframe system. Under that set-up, a company employee—whether a manager or a subordinate—is not really using the computer; instead, he's using information that has been preordained for him and that may or may not suit his purposes."

Opening the doors

To many corporate managers who have turned to personal computers, that story is typical of the kinds of conflicts that are everyday fare at

their firms. To them, the issue centers on the lines drawn between institutional or impersonal computers as opposed to personal computers. The question, as they see it, is: Should the way information flows and the way advanced electronic networks are set up at a company be decided solely at the corporate boardroom level, or should the system be decentralized and designed for individual departments.

Allen Sneider, an accountant at the Boston office of Laventhol & Horwath, a management-consulting and accounting firm, has been using a personal computer since 1978. Sneider is convinced that the answer is clear-cut: "The technology a corporation owns should not be behind closed doors anymore," he says.

And the former marketing vice president, who is now a highly placed computer-industry analyst, echoes Sneider in saying that the personal computer is the force pushing technology out into the open. "The personal computer takes the power of computing out of the corporate computing room," he says. "The data-processing profession was formerly the high priesthood of computer power and held the keys to the sanctuary. Now, people who can best use the results of it are computing. This is a fundamental revolution."

Resounding effects

This revolution is clearly playing itself out in corporations. But, taking it a step further, it is a much more meaningful and wider one than is subsumed only on the corporate economic battlefield. The revolution, in fact, touches the pulse that guides and furthers a democratic society—the availability of information.

Larger computers controlled by institutions—whether corporations, banks, credit-information providers or think tanks—have served to frighten the general public and have created a distance between society at large and the new technologies.

People are afraid that they can't fight or get an even break from cold-hearted machines, and they are suspicious of what tales are being spread about their personal lives over massive data banks that they never see.

Personal computers, on the other hand, link society to the world of exploding information. With the punching of buttons, data flow into the home or office of any user, without regard to his place on the ladder of caste.

An electronic appendage

Perhaps, though, the most crucial facet separating the personal computer from its ancestors in the mainframe world is its place as an extension of human power and consciousness. An analogy that Steve Jobs, chairman and co-founder of Apple Computer, likes to make serves to clinch the point.

According to Jobs, a recent study concluded that, from an energy-use standpoint, the California condor, a nearly extinct large Western bird, is the most physically efficient animal on earth. The human was rated far down the list. However, the study added that when man pedals a bicycle, his locomotive abilities improve so greatly that he becomes twice as efficient as the condor. The bicycle, unlike an automobile or a freight train, needs a complement of human power to make it run. And in a sort of symbiotic relationship, after the human puts it in motion, the bicycle in turn vastly increases human physical capabilities.

Jobs feels that the relationship between the bicycle and man is analogous to the relationship the personal computer has with man.

And many others agree. The personal computer, they say, like the bicycle, furthers man's abilities—in this case, his mental faculties—and thus is an extension of human potential and power. It is a servant to expanding the needs of man in an informational society. 

The newest confidence builder.

Micro-DSS™ / ANALYSIS joins Micro-DSS™ / FINANCE to provide business software that is practical, versatile and easy to use.

In just the few months that Micro-DSS / FINANCE (DSS / F) has been available, major companies have discovered its versatility and value. With DSS / F they can examine all their options and support their financial decisions.

For example, one company uses it up to 12 hours a day for financial modeling, financial feasibility studies, preparation of P&L statements, and general financial analysis. A major corporation does project appraisal, simulation studies and financial projections. And another company uses all DSS / F's modeling and forecasting features, plus its graphics to study over 100 alternatives for each feasibility study it does for a new facility. For them DSS / F's reliability is reassuring.

Micro-DSS / ANALYSIS (DSS / A) will have the same appeal for data and policy analysis. Its statistical and analytical functions enable you to turn raw data into useful information immediately.

You can study data, sorting it first one way, then another. You can create new combinations, explore relationships, answer specific questions—and measure the impact of real or potential changes. At the end you can quickly print out any information you choose in high-quality, custom reports or graphs.

If you deal with complex, volatile issues or issues involving massive, quantitative data, DSS / A provides vital support. It will aid in such areas as broad scale Resource Allocation and Financial Planning, Marketing Analysis and Forecasting, Policy Analysis, Impact Analysis, and Sales Analysis and Sales Force Management.

DSS / A is explicitly designed to provide the flexibility the analyst needs. But best of all it integrates elements of data base management, modeling, statistical analysis, and graphics into one simple system that is extremely easy to learn and use.

DSS / F is now available for the Apple and will be available for other selected desktop computers. DSS / A will be available Spring 1982. Suggested retail price: DSS / F \$1500, DSS / A \$595 (Tentative).

Micro-DSS is a trademark of Addison-Wesley Publishing Company, Inc.
Apple is a trademark of Apple Computer, Inc.

For more information on DSS / F for financial decision support and DSS / A to facilitate planning and analysis see your computer dealer or contact:

**Introducing
DSS / A**

**Software Marketing
Addison-Wesley
Publishing Company, Inc.**
Reading, MA 01867
(617) 944-3700



The IBM Personal Computer

Personal, Professional, Technical — or somewhere in between ...
PC-MATE™ makes the IBM Personal Computer a perfect match

PC-MATE™ from TECMAR is the first and only complete expansion series available for the IBM Personal Computer. There are currently more than twenty PC-MATE™ expansion options available, and new products are continuously added to the list.

When you want more from your IBM Personal Computer, look to PC-MATE™.

You can create a SUPER PERSONAL COMPUTER with household lights and appliance control, voice output, and give it more memory than any ordinary personal can handle.

Or make it a PROFITABLE PROFESSIONAL SYSTEM with expansion space and a Winchester disk to handle more business accounts. Increase memory up to

the system limit and process those accounts faster. Add flexible I/O interfaces and put yourself on line to outside information sources.

As an INTELLIGENT LABORATORY TOOL with interfaces to IEEE 488 instrumentation, analog signals, stepper motors and video signals, your IBM Personal Computer becomes the perfect workbench assistant.

Hardware, Software, Accessories — PC-MATE™ provides the highest quality and the greatest possible range of functionality for the IBM user.

Ask your local computer store for more information on the PC-MATE™ series from TECMAR, or call for the name of your nearest authorized PC-MATE™ dealer.

PC-MATE™ EXPANSION OPTIONS

Personal Computer Expansion Chassis (see photo)
192K and 256K Dynamic Memory with Parity
Winchester Disk Drive and Controller
Parallel Medium Speed Input/Output Interface
Serial Medium Speed Input/Output Interface
Parallel High Speed Input/Output Interface
Serial High Speed Input/Output Interface
Analog to Digital Converter - 8, 12, 14, 16 Bit
Dust Cover Set for IBM PC and Peripherals
High Speed Static Memory (RAM/ROM)
Digital to Analog Converter - 8 and 12 Bit
Multi-System Printer Sharing Facility
CMOS Memory with Battery Backup
System Clock with Battery Backup
Electrically Erasable EPROM
BSR X-10 Device Controller
Stepping Motor Controller
Video Image Digitizer
IEEE 488 Interface
Prototyping Board
Music Synthesizer
Voice Synthesizer
Extender Board

One Year Warranty

Additional products are already under development, so if we don't have what you need, chances are good that we soon will.



CIRCLE 16

Tecmar Inc. PERSONAL COMPUTER PRODUCTS DIVISION
23600 Mercantile Rd., Cleveland, OH 44122 (216) 464-7410

Have Your Cost Estimates Lost Credibility?

Getting an on-the-money cost measurement is no longer an accounting fantasy. It's a software reality

by Alan Radding

"How much will it cost?" may sound like an easily answered question to a customer, but to a businessman, the tangled route to the answer can be as confounding as trying to find the meaning of a Biblical parable. In exasperation, some companies are turning to personal computers for direction in estimating costs—a business procedure that is becoming more and more complicated.

In older business-accounting books, the formula offered was simply to add the price of the raw materials to the labor charge and then add a percentage for the overhead. The sum was the bottom-line cost.

But today, while the formula essentially holds, the number of factors that must be taken into account has leapfrogged. There may be dozens of material costs to consider. For instance, a typical construction project may need equipment and parts from numerous separate categories, each of which has a host of different line items. And workers are now broken down into even more thinly divided groups with divergent salaries, fringe benefits and time on the job. Add to this the variations in shipping and packing costs, overhead, taxes and volume discounts, and it becomes clear that it takes an oracle to sift through the information, juggle it, and come up with a competitive price that will still be accu-

rate when the job is completed. And sometimes an inaccurate bid is worse than no bid at all.

From the ground up

One company that has, at least partially, eschewed the manual work and opted for electronic cost estimating is the Commeau Corp. in Wayland, Mass., developers of commercial buildings. The firm, now run by Alain Commeau and his brother, Claude, dates back three family generations.

For a little less than a year, the Commeaus have been using a TRS-80 Microcomputer Model II with a dual disk drive and Epson printer to handle their cost estimating. "We work on a variety of commercial buildings," says Alain, the company's president, "and we get a lot of calls from people who don't have a lot of information, and can only give us the overall size of the project." Alain can input those few, basic figures into the computer and come up with a well-grounded initial estimate.

As more details of the ultimate project are revealed to the Commeau brothers, that information can be plugged into the original cost estimate and re-evaluated. "As we get more detail, we can be more accurate in our estimates," Alain says.

The computerized cost estimates, according to the Commeaus, are coming within five percent of the final cost. Still, the brothers have not yet turned over their entire estimating operation to the machine. The

company continues to employ a worker to figure estimates by hand, and then a reconciliation is made between the two results. This is a throw-back to the pre-computer days when, as a fail-safe mechanism, the firm had two estimates worked up manually. The final tally does not always coincide under the present system, but the spread has narrowed. "When we estimated manually, the figures sometimes weren't even close," says Claude, who is the company's vice president.

The program being used by the Commeau Corp. was developed, using VisiCalc, by Claude, after his futile search for commercial cost-estimating software. Claude discovered that the few true cost-estimating programs available for personal computers were not particularly appropriate for Commeau's purpose. He wanted a program that would "mime" exactly what his company was doing by hand, using the same formulas in the same ways.

Learning the ropes

"I looked through all the software publications, read all the material, and haunted all the computer stores in the Boston area," Claude recalls. "When I started, I was pretty naive. I thought that somebody must have written a good cost-estimating package for about \$200."

But by using VisiCalc, Claude was able to essentially custom-build his own cost-estimating program, "reproducing what we do with a pencil and paper." By setting up the pro-

Alan Radding is a free-lance writer and frequent contributor to Personal Computing.

“When we estimated manually, the figures sometimes weren’t even close.”

gram to exactly reproduce his own categories of costs and expense classifications, he discovered that “we don’t miss a category when we are rushing.” In the past, he says, even when the best estimators worked by hand, something was often left out.

But more important is the ability of the computer to “change gears” rapidly and allow for variations in pricing. Commeau’s program automatically absorbs and rejiggers costs for different quantities, materials and processes.

Not much demand

Finding commercial cost-estimating software may be as difficult as it is because relatively few businessmen request it, says Barry Passen, president of Microcon Software in

Waltham, Mass., a computer store dedicated to software sales. When businessmen go looking for programs dealing with costs, they usually want a system that guides them through controlling costs on the job as well as estimating them, Passen adds.

Standard VisiCalc-type programs are very good for cost-estimating purposes, Passen says, because their “what-if” capabilities enable the businessman to plot out and compare different scenarios. Much of the information needed—costs and their algorithms—is already on hand if a company is doing manual estimating; it need only be transferred to the computer.

There are also alternatives. Passen advises businessmen looking for cost-estimating programs to first carefully

define their needs. Other programs, besides VisiCalc, may be more appropriate, such as a standard cost accounting program, usually less sophisticated than VisiCalc, which allows projections of financial situations using variable data; a database management program, which simplifies access to all applicable data and helps in decision-making; or a bill-of-goods program, which is an inventory worksheet.

One man who was able to bend a commercial program to his cost-estimating needs is Dick Hammond, president of Country Lane Builders in South Lancaster, Mass. After doing extensive shopping for commercial packages, he purchased an accounting package specialized for the construction industry. The soft-



photo by Janet Mandler

The Commeau brothers, developers of commercial buildings, custom built their own cost-estimating program, which exactly duplicates what they used to do by hand. The program reproduces their own categories of costs and expense classifications.



"WHAT IF..."

Seldom is your first solution to a problem the only one, or the one that's necessarily best to use.

That's why our VisiCalc® program is #1 in the business: the most widely-used business program ever for the personal computer.

It's a powerful "electronic worksheet" that takes the work out of working with numbers. Whether you are working with investments, cash flow, inventory, estimates, budgets, plans—nearly anything numerical, the VisiCalc program will help you work better, smarter, faster.

In just seconds, the VisiCalc program can calculate and display the answers to involved problems you could have spent hours doing by hand.

Its speed and versatility makes it easy for you to explore more alternatives. You can ask "What if?"... just change any number in your problem and instantly, the VisiCalc program recalculates all the numbers and displays the new results. So you can

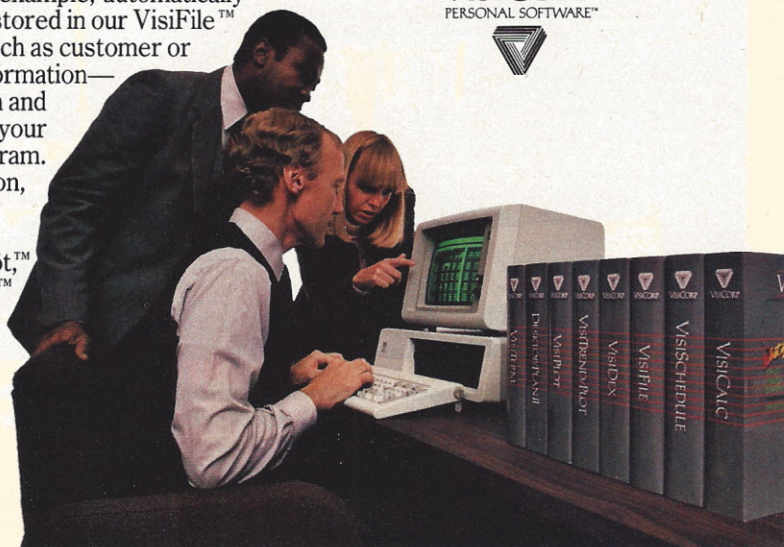
readily analyze the impact of decisions before you make them.

While the VisiCalc program does a lot by itself, it can do even more for you when used with the other Visi™ programs. That's because they're all inter-related, just like your needs and tasks, to give you a fully integrated solution. For example, automatically bring in data stored in our VisiFile™ program—such as customer or inventory information—for calculation and analysis with your VisiCalc program.

In addition, our series includes the VisiTrend/Plot,™ VisiSchedule,™ VisiDex,™ VisiTerm,™ VisiPlot,™ and Desktop/PLAN™ programs.

Ask your retail computer store salesperson for a demonstration of the VisiCalc program. Discover how easy it is to take the work out of working with numbers.

VISI CALC™ FROM
VISICORP™
PERSONAL SOFTWARE™



ware, from Construction Data Control Inc. (CDCI) in Atlanta, Ga., included the bare bones of a cost-estimating program. Hammond uses a TRS-80 Model II, with a dual disk drive and two Tandy printers, a daisywheel and a Line Five.

For his purposes, Hammond says, the more specialized construction package surpasses VisiCalc and similar programs in having the information capacity required by developers for cost estimating. Hammond uses several disks full of information, set up according to "catalogs" provided in the program. "You create the catalog yourself," says Hammond, although the format is part of the program.

The price formula is built into the program, but Hammond must compute the amounts of materials he will use. A typical item for framing might require inputting data on linear feet, labor and the material to generate the final cost.

The VisiCalc edge

Hammond does use VisiCalc as part of his overall system. For instance, he uses it to track changes in the costs per unit of various materials. Rather than alter a catalog, he might simply add the price changes at the end of the cost estimate. But it is VisiCalc's ability to include additional variables after the program has run its estimate that most impresses Hammond. With this ability, called "burdening," Hammond can compensate for whatever outside factors influence the final result, such as taxes or insurance.

Having operated the system for almost a year, Hammond has realized a saving of 50 percent in the time it takes to do an initial estimate. When he figures in the ease of the inevitable re-working of estimates, Hammond calculates that the computer saves time by a factor of four or five.

With the cost in work-hours of developing complex software still

high, many firms try to recoup the investment by selling their programs on the open market. Centec Process Systems, an engineering firm in Reston, Va., created a manufacturing cost-estimating program for its own use and, after two years, made the program commercially available for use on an Apple II. Unlike many homegrown cost-estimating programs, the Centec program comes with full, professional documentation and a money-back guarantee. "No one has used the guarantee," says product manager Robert Mang.

The Centec program lays out a cost sheet with room for up to 20 separate categories and 120 line items, depending upon the memory capacity of the particular system. Input quantities, prices, time, overhead percentage appropriations, salaries and hourly rates, and the program will compute the cost estimate.

Unlike a VisiCalc-type program, the basic formulas are built into the system. The fundamental formula is quantity plus rate times time ($q + (r \times t)$), notes Mang. There are special provisions for capital costs as a percentage of the total and indirect expenses, and the user can see the individual contribution of each item in the final tally.

The program is part of a package that contains discounted cash flow but is also sold separately. The major application is for manufacturing, says Mang. TRS-80 and CP/M versions are being developed.

Cost estimating is one of those tasks that is inherently well suited to the computer, because, in a sense, every cost estimator is already a programmer. The craft involves establishing variables, setting up cost algorithms, developing proper equations and defining values. Instead of reinventing the whole procedure each time with a pencil and paper, it can be done once with a personal computer and then used, reused and updated with speed, ease and accuracy. 

GET A HEAD START WITH PERSONAL COMPUTING

Each day sees more people—businessmen, professionals, educators and home users—turning to personal computers to achieve their goals. And each day more of these same people will be turning to PERSONAL COMPUTING Magazine to help them use and master their computer.

PERSONAL COMPUTING is essentially a magazine of ideas. Ideas for new ways to use your computer and ideas that will stimulate your own creativity.

In every issue, we will tell you how others—from Fortune 500 executives, to small-businessmen, to individuals using personal computers in their home—are solving problems and opening up new opportunities. Also, there are feature articles on Business, Professional/Managerial, Home, Leisure, Educational and Advanced Computing.

PERSONAL COMPUTING keeps you informed about new products, too—hardware, software and peripherals that can help you expand the range and versatility of your system. And we keep you up-to-date on events and developments in the world of personal computers. Through special reports and in-depth interviews, we give you a rare glimpse of what lies ahead.

Subscribe to PERSONAL COMPUTING today and SAVE!

Yes, send me twelve information-packed issues of PERSONAL COMPUTING for just \$18.00, the regular subscription price. That's \$6 less than the newsstand price.

I understand that I may cancel at any time, for any reason and receive a full refund for the balance of my subscription.

☐ Payment enclosed ☐ Bill me

Name _____
(please print)

Address _____

City _____

State/Zip _____

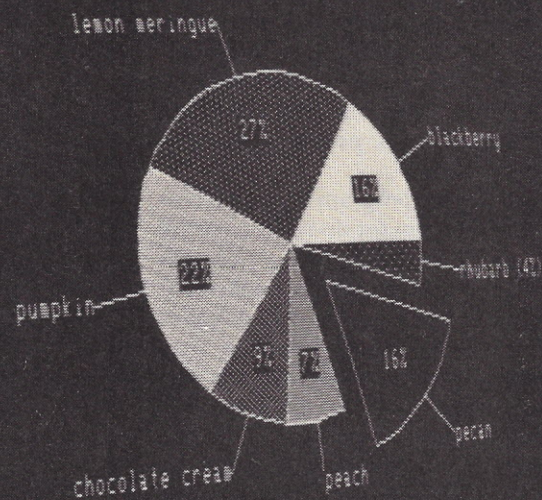
Your subscription may be tax deductible. Please allow 6-8 weeks for receipt of your first issue. 2328

MAIL TO
PERSONAL COMPUTING
4 Disk Drive
Box 1408
Riverton, NJ 08077

North Star offers you an

NorthStar **ADVANTAGE**

MOTHERS PIE SHOP DAILY SALES ANALYSIS



incredible AdvantageTM over IBM and Apple.

The ADVANTAGETM desktop computer from North Star is better in every category than either the IBM Personal Computer or the Apple III. Compare for yourself!

Incredible Data Storage:

The ADVANTAGE has twice the diskette capacity of either the IBM PC or the Apple III. This means you have twice as much information at hand.

Incredible Graphics:

The ADVANTAGE gives you a higher precision display. A revolutionary software package called BUSIGRAPHTM is provided at no extra charge for preparing graphs, bar charts, and pie charts.

Incredible Software:

The ADVANTAGE is fully CP/M[®] compatible. Neither IBM nor Apple provides this ability to run the broadest range of industry-standard applications. In addition, only North Star offers 10 application packages for word processing, financial analysis, accounting and data base management.

Incredible Convenience:

ADVANTAGE is the only one of the three that's fully-integrated. It fits attractively on your desk without the clumsiness of the multiple-enclosure, multiple-cable approach taken by IBM and Apple.

Incredible Price:

The ADVANTAGE from North Star offers you the best in price/performance. You get more data storage per dollar invested, more applications programs, more available languages, and more graphics capabilities. At an incredible list price of \$3999.

To find out more about our incredible family of desktop computers with graphics, call TOLL FREE 800-447-4700. (Illinois 800-322-4400.)

North Star Computers, Inc.
14440 Catalina St., San Leandro,
CA 94577 USA (415) 357-8500.
TWX/Telex (910) 366-7001.

North Star, ADVANTAGE and BUSIGRAPH are trademarks of North Star Computers, Inc. CP/M is a registered trademark of Digital Research, Inc.

THE INCREDIBLE ADVANTAGE COMPUTER COMPARISON CHART*

	NORTH STAR ADVANTAGE	IBM PERSONAL COMPUTER	APPLE III
MICROPROCESSOR(S)	Z-80A Central processor 8035 Auxiliary processor	8088 processor	6502A processor
GRAPHICS DISPLAY RESOLUTION	640x240 pixels	640x200 pixels	560x192 pixels
DUAL FLOPPY DISC CAPACITY	720K bytes	320K bytes	280K bytes
CONVENIENT DESKTOP PACKAGE*	Yes, all in one enclosure	No, 3 enclosures	No, 3 enclosures
BUSINESS GRAPHICS SOFTWARE INCLUDED?	Yes	No	No
CP/M COMPATIBLE?	Yes	Partial	No
LANGUAGES SUPPLIED BY MANUFACTURER	Graphics BASIC, PASCAL, COBOL, FORTRAN, C	BASIC, PASCAL	BASIC, PASCAL
APPLICATION S/W PACKAGES SUPPLIED BY MANUFACTURER	10 packages	5 packages	5 packages
SELF-TEST DIAGNOSTIC	Yes	Yes	No
NATIONAL ON SITE SERVICE	Yes	No	No
MANUFACTURER SUPPLIED PRINTERS	Letter quality/matrix (136 columns)	Matrix (80 columns)	Letter quality/matrix (80 columns)
RETAIL PRICE PER KILOBYTE OF DISK STORAGE	\$5.55	\$11.17	\$15.57

*Professional configuration: Dual Floppy Disks, Monochrome Display, Keyboard, CPU, 64K bytes (or minimum) RAM Memory, and Printer Interface.

Source: Dataquest and Manufacturer's Literature, November 1981.

FOLLOW THE STAR
NorthStarTM
CIRCLE 51

See us at Office Automation Conference, April 5-7, Booth 836

Coming On-Line With The World

By accessing a communications network, timely information can be exchanged even faster than it was across the wash line

by David James

When Alexander Graham Bell predicted that the telephone would one day link the world, critics rejected his idea as utopian. Yet this communications utopia exists in reality today: The personal computer, with a little help from Ma Bell, is now a practical, affordable provider of access to information networks.

Perhaps the single most exciting development in the use of personal computers is the growing interest in the computer as a communications device. Working in much the same manner as a telephone linkage—but far more flexible in terms of the amount of data that can be carried—communications networks are springing up throughout the United States.

These networks offer the option of leaving messages for a friend in some other part of the country, and providing news and financial information, educational programs and material, weather, travel schedules and electronic shopping. The commercial potential for the personal computer to act as an electronic window has not been lost on many of America's biggest corporations. This group includes Warner Communications, some of the nation's largest newspaper chains and retail stores—not to mention good ol' Ma Bell herself.

The delivery into the home of a virtually limitless number of information services, via cable television, on-line information retrieval services,

and new hybrids of technology such as "videotex" and "teletex" is indeed big business. And all indications point to a continuing growth of communications capabilities for the computer, because it will be the focal point of access for most of these information and networking services.

Growing up with mainframes

But before these communications capabilities for personal computers were developed, communications got its start in the world of mainframes and minicomputers. The development of so-called "batch processing" for mainframe and minicomputer users, such as banks and other financial institutions, was a major step forward in computer communications in general. The whole point to communications, in that context, was to transmit and receive large amounts of data in a reasonably economical form.

Working toward this end, computer manufacturers began to develop devices that would permit the transmission of larger blocks of data over the telephone lines. (One of the ironies of computer communications is that the telephone, a somewhat anachronistic communications device, is the major means by which all of this data is sent.)

In this endeavor, IBM took the lead in developing industry standards for data transmission, particularly in terms of software. Once the standards were agreed upon, taking into account that the telephone lines have certain limitations, mainframe and

minicomputer manufacturers watched the data-processing industry grow. The larger number-crunchers were soon linked in a variety of far-flung networks, such as one that links a reservations clerk for an airline in Los Angeles with a central data-processing operation in Phoenix. This type of network allows huge amounts of data to be sent in blocks between network terminals for processing, which is an extremely fast operation.

But the personal computer was not far behind the mainframes and minicomputers in terms of its perceived communication value to the businessman and the home user. As more computers were sold, the interest in using them as communications terminals, rather than just as stand-alone computers, led manufacturers to adapt communications technology for the smaller machine, accomplishing the same data transmission that communications devices serve for the larger computers.

The roots of networks

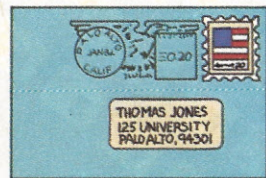
But what type of data? Getting your reservation acknowledgement at home is nice, but there's more to the world than that. It is in the area of software, or more specifically, the data base, that the personal computer provides a radical departure from the larger machines in communications products. As soon as the idea of computer "networks" became viable, commercial networking systems sprang up. At first, these services were notable chiefly for their ability to allow computer users to com-

David James is a free-lance business writer whose specialty is commenting on the personal-computing field.

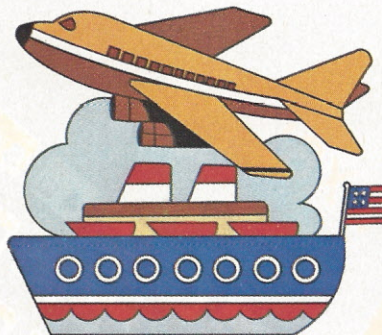
"McLuhan's concept of an information-linked global society has proven to be more than just a writer's fancy."



NEWS



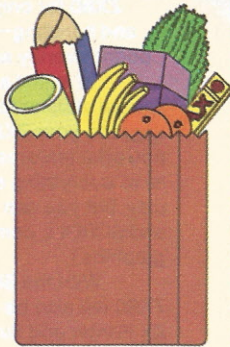
ELECTRONIC MAIL



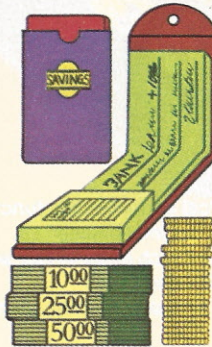
TRAVEL



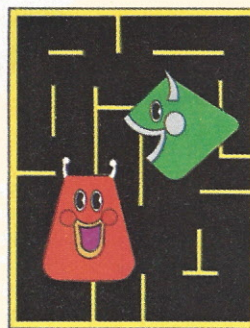
EDUCATION



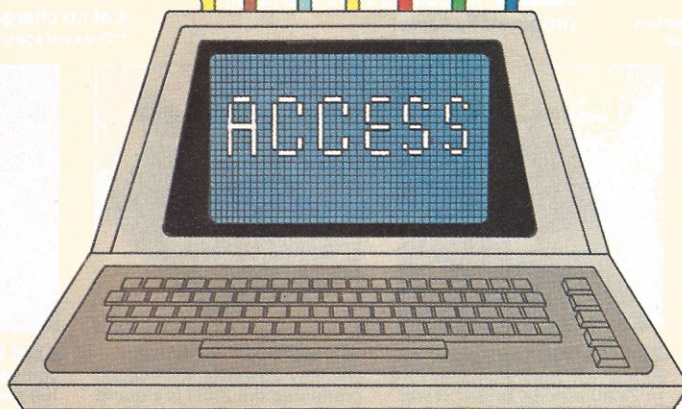
SHOPPING



BANKING



GAMES



The \$149⁹⁵ personal computer.



Introducing the Sinclair ZX81

If you're ever going to buy a personal computer, now is the time to do it.

The new Sinclair ZX81 is the most powerful, yet easy-to-use computer ever offered for anywhere near the price: only \$149.95* completely assembled.

Don't let the price fool you. The ZX81 has just about everything you could ask for in a personal computer.

A breakthrough in personal computers

The ZX81 is a major advance over the original Sinclair ZX80—the world's largest selling personal computer and the first for under \$200.

In fact, the ZX81's new 8K Extended BASIC offers features found only on computers costing two or three times as much.

Just look at what you get:

- Continuous display, including moving graphics
- Multi-dimensional string and numerical arrays

*Plus shipping and handling. Price includes connectors for TV and cassette, AC adaptor, and FREE manual.

- Mathematical and scientific functions accurate to 8 decimal places
- Unique one-touch entry of key words like PRINT, RUN and LIST
- Automatic syntax error detection and easy editing
- Randomize function useful for both games and serious applications
- Built-in interface for ZX Printer
- 1K of memory expandable to 16K

The ZX81 is also very convenient to use. It hooks up to any television set to produce a clear 32-column by 24-line display. And you can use a regular cassette recorder to store and recall programs by name.

If you already own a ZX80

The 8K Extended BASIC chip used in the ZX81 is available as a plug-in replacement for your ZX80 for only \$39.95, plus shipping and handling—complete with new keyboard overlay and the ZX81 manual.

So in just a few minutes, with no special skills or tools required, you can upgrade your ZX80 to have all the powerful features of the ZX81. (You'll have everything except continuous display, but you can still use the PAUSE and SCROLL commands to get moving graphics.)

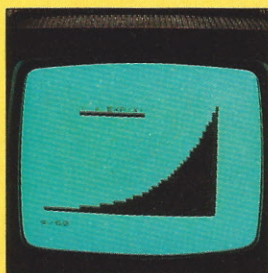
With the 8K BASIC chip, your ZX80 will also be equipped to use the ZX Printer and Sinclair software.

Order at no risk**

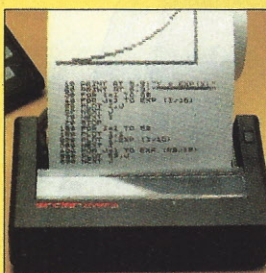
We'll give you 10 days to try out the ZX81. If you're not completely satisfied, just return it to Sinclair Research and we'll give you a full refund.

And if you have a problem with your ZX81, send it to Sinclair Research within 90 days and we'll repair or replace it at no charge.

**Does not apply to ZX81 kits.



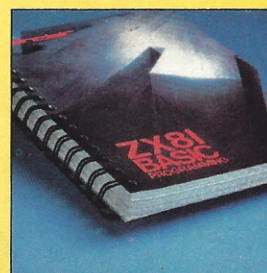
NEW SOFTWARE: Sinclair has published pre-recorded programs on cassettes for your ZX81, or ZX80 with 8K BASIC. We're constantly coming out with new programs, so we'll send you our latest software catalog with your computer.



ZX PRINTER: The Sinclair ZX Printer will work with your ZX81, or ZX80 with 8K BASIC. It will be available in the near future and will cost less than \$100.



16K MEMORY MODULE: Like any powerful, full fledged computer, the ZX81 is expandable. Sinclair's 16K memory module plugs right onto the back of your ZX81 (or ZX80, with or without 8K BASIC). Cost is \$99.95, plus shipping and handling.



ZX81 MANUAL: The ZX81 comes with a comprehensive 164-page programming guide and operating manual designed for both beginners and experienced computer users. A \$10.95 value, it's yours free with the ZX81.

The \$99⁹⁵ personal computer.

Introducing the ZX81 kit

If you really want to save money, and you enjoy building electronic kits, you can order the ZX81 in kit form for the incredible price of just \$99.95*. It's the same, full-featured computer, only you put it together yourself. We'll send complete, easy-to-follow instructions on how you can assemble your ZX81 in just a few hours. All you have to supply is the soldering iron.

How to order

Sinclair Research is the world's largest manufacturer of personal computers.

The ZX81 represents the latest technology in microelectronics, and it picks up right where the ZX80 left off. Thousands are selling every week.

We urge you to place your order for the new ZX81 today. The sooner you order, the sooner you can start enjoying your own computer.

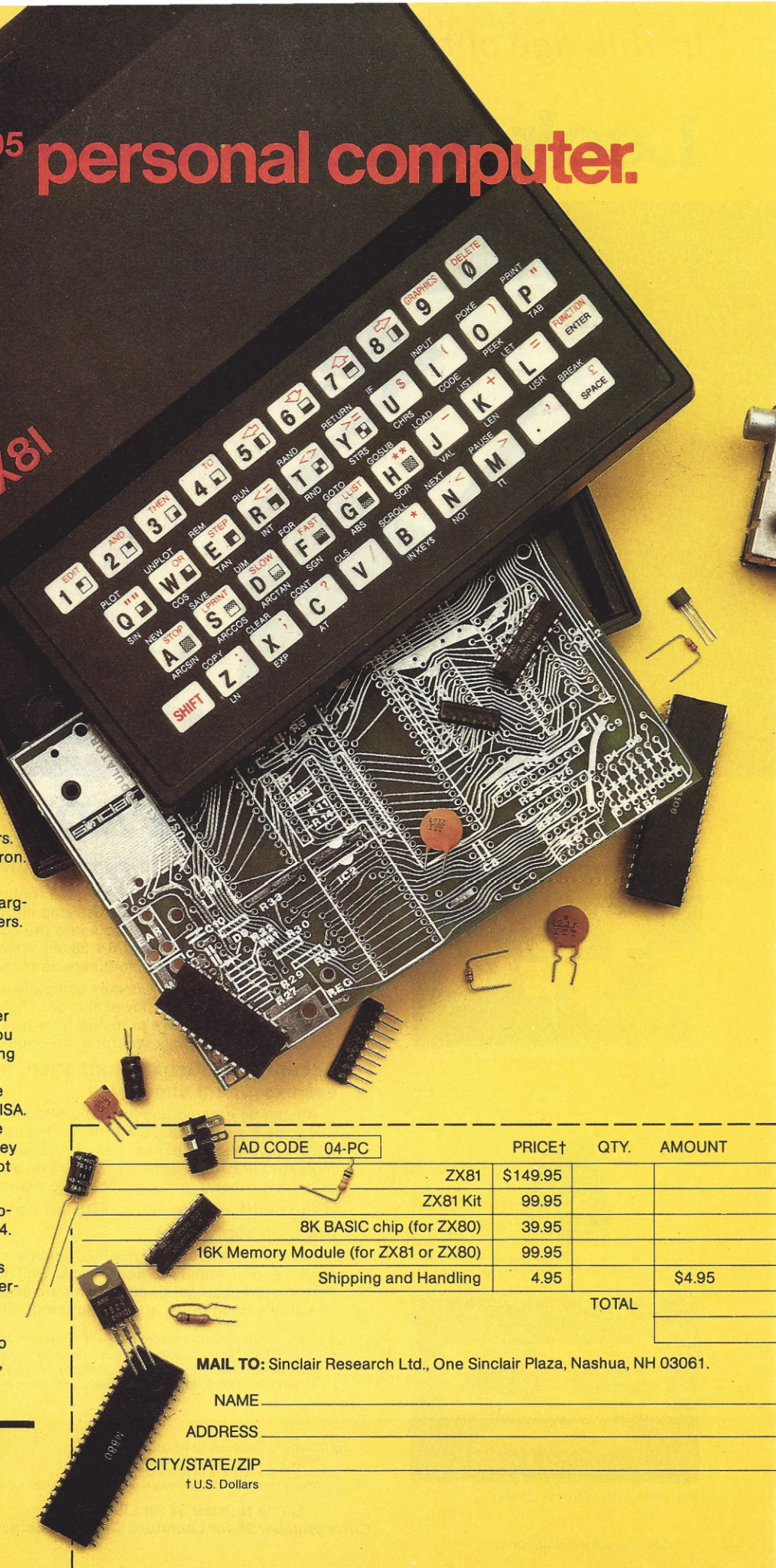
To order, simply call our toll free number, and use your MasterCard or VISA.

To order by mail, please use the coupon. And send your check or money order. We regret that we cannot accept purchase orders or C.O.D.'s.

CALL 800-543-3000. Ask for operator #509. In Ohio call 800-582-1364. In Canada call 513-729-4300. Ask for operator #509. Phones open 24 hours a day, 7 days a week. Have your MasterCard or VISA ready.

These numbers are for orders only. For information, you must write to Sinclair Research Ltd., 2 Sinclair Plaza, Nashua, NH 03061.

sinclair



AD CODE 04-PC

PRICE†

QTY.

AMOUNT

ZX81

\$149.95

ZX81 Kit

99.95

8K BASIC chip (for ZX80)

39.95

16K Memory Module (for ZX81 or ZX80)

99.95

Shipping and Handling

4.95

\$4.95

TOTAL

MAIL TO: Sinclair Research Ltd., One Sinclair Plaza, Nashua, NH 03061.

NAME _____

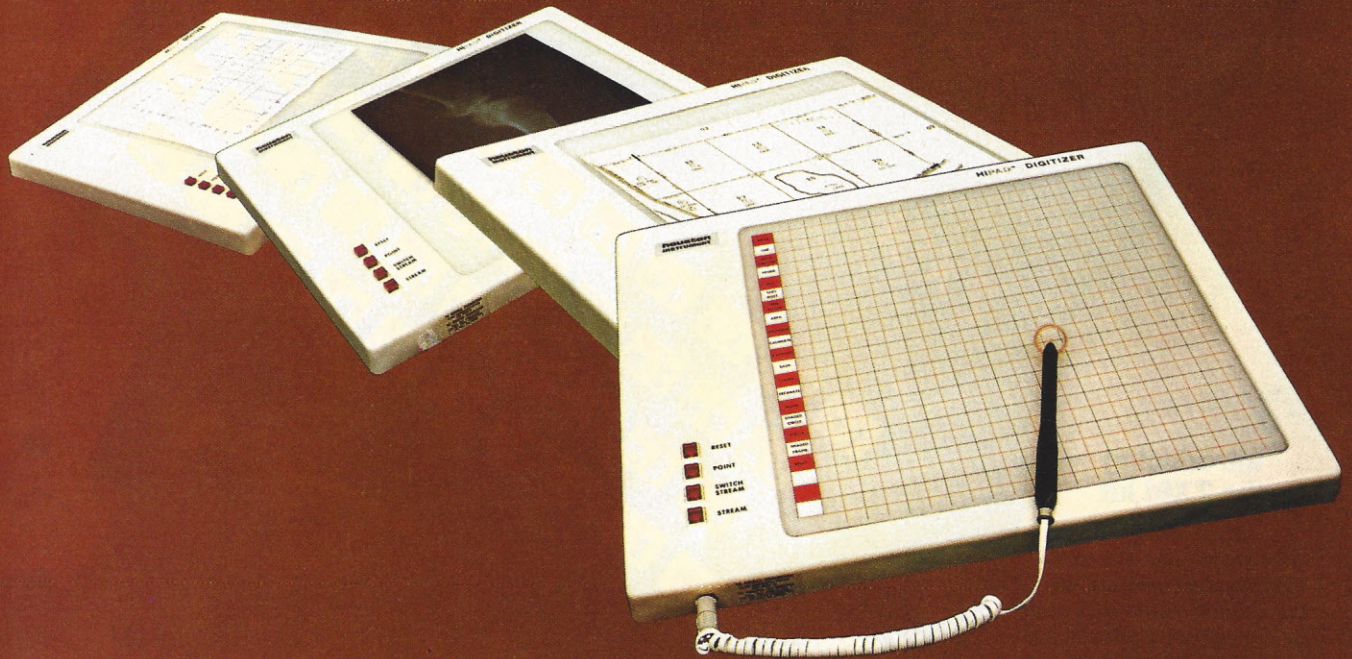
ADDRESS _____

CITY/STATE/ZIP _____

† U.S. Dollars

In this age of runaway inflation...

Look what \$825* will buy



The HIPAD™ digitizer

Inexpensive input to your computer

The HIPAD™ digitizer can be used for both converting graphic information into digital values and as a menu. Utilizing either the stylus or the optional cursor, the operator can input graphic data into the computer by locating individual points on the digitizers 11" x 11" (28cm x 28cm) active area. In the "stream mode" a continuance of placements of coordinate pairs may be input.

Not a kit, the HIPAD™ comes complete with both RS-232-C and parallel interfaces and has its own built-in power source. The origin is completely relocatable so coordinates may be positive or minus for a true reference value and oversized material may be input by simply resetting the origin.

Accurate positional information, free form sketches, even keyboard simulation

All can be entered using the multi-faceted HIPAD™ digitizer. Its capabilities and low price make the UL listed HIPAD™ a natural selection over keyboard entry, inaccurate joysticks, or expensive approximating light pens. It's perfect for inputting isometric drawings, schematics, X-rays, architectural drawings, business graphs, and many other forms of graphic information, as well as creating your own graphics.

Use it with Apple II™, TRS-80 Level II™, PET™ or other popular computers

The HIPAD's™ built-in RS-232C and parallel 8 bit interfaces make it all possible. (For Apple II order DT-11A, for TRS-80 or PET order DT-11). Furthermore, you get English or metric scaling, data format (Binary/BCD/ASCII), selectable baud rates, and resolution of either .005" or .01".

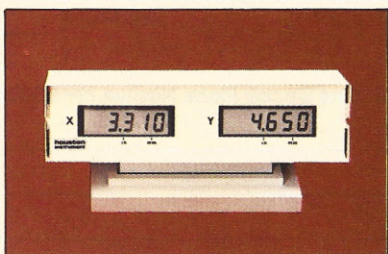
For complete information, contact Houston Instrument, P.O. Box 15720, Austin, Texas 78761. (512) 835-0900. For rush literature requests, outside Texas call toll free 1-800-531-5205. For technical information ask for operator #5. In Europe contact Houston Instrument, Rochesterlaan 6, 8240 Gistel, Belgium. Phone 059/27-74-45. Telex Bausch 81399.



The ideal input device for the small system user.

Model	Price	Model	Price	Model	Price	Model	Price
DT-11-1	\$45.00	DT-11-2	\$45.00	DT-11-3	\$45.00	DT-11-4	\$45.00
DT-11-5	\$45.00	DT-11-6	\$45.00	DT-11-7	\$45.00	DT-11-8	\$45.00
DT-11-9	\$45.00	DT-11-10	\$45.00	DT-11-11	\$45.00	DT-11-12	\$45.00
DT-11-13	\$45.00	DT-11-14	\$45.00	DT-11-15	\$45.00	DT-11-16	\$45.00
DT-11-17	\$45.00	DT-11-18	\$45.00	DT-11-19	\$45.00	DT-11-20	\$45.00
DT-11-21	\$45.00	DT-11-22	\$45.00	DT-11-23	\$45.00	DT-11-24	\$45.00
DT-11-25	\$45.00	DT-11-26	\$45.00	DT-11-27	\$45.00	DT-11-28	\$45.00
DT-11-29	\$45.00	DT-11-30	\$45.00	DT-11-31	\$45.00	DT-11-32	\$45.00
DT-11-33	\$45.00	DT-11-34	\$45.00	DT-11-35	\$45.00	DT-11-36	\$45.00
DT-11-37	\$45.00	DT-11-38	\$45.00	DT-11-39	\$45.00	DT-11-40	\$45.00
DT-11-41	\$45.00	DT-11-42	\$45.00	DT-11-43	\$45.00	DT-11-44	\$45.00
DT-11-45	\$45.00	DT-11-46	\$45.00	DT-11-47	\$45.00	DT-11-48	\$45.00
DT-11-49	\$45.00	DT-11-50	\$45.00	DT-11-51	\$45.00	DT-11-52	\$45.00
DT-11-53	\$45.00	DT-11-54	\$45.00	DT-11-55	\$45.00	DT-11-56	\$45.00
DT-11-57	\$45.00	DT-11-58	\$45.00	DT-11-59	\$45.00	DT-11-60	\$45.00
DT-11-61	\$45.00	DT-11-62	\$45.00	DT-11-63	\$45.00	DT-11-64	\$45.00
DT-11-65	\$45.00	DT-11-66	\$45.00	DT-11-67	\$45.00	DT-11-68	\$45.00
DT-11-69	\$45.00	DT-11-70	\$45.00	DT-11-71	\$45.00	DT-11-72	\$45.00
DT-11-73	\$45.00	DT-11-74	\$45.00	DT-11-75	\$45.00	DT-11-76	\$45.00
DT-11-77	\$45.00	DT-11-78	\$45.00	DT-11-79	\$45.00	DT-11-80	\$45.00
DT-11-81	\$45.00	DT-11-82	\$45.00	DT-11-83	\$45.00	DT-11-84	\$45.00
DT-11-85	\$45.00	DT-11-86	\$45.00	DT-11-87	\$45.00	DT-11-88	\$45.00
DT-11-89	\$45.00	DT-11-90	\$45.00	DT-11-91	\$45.00	DT-11-92	\$45.00
DT-11-93	\$45.00	DT-11-94	\$45.00	DT-11-95	\$45.00	DT-11-96	\$45.00
DT-11-97	\$45.00	DT-11-98	\$45.00	DT-11-99	\$45.00	DT-11-100	\$45.00

Available with stylus or optional cursor.



Available with optional display.

*U.S. Suggested retail price

TM HIPAD is a trademark of Houston Instrument
TRS-80 is a trademark of Tandy Corporation
APPLE is a trademark of Apple Computer Inc.
PET is a trademark of Commodore Business Machines, Inc.

Circle Number 34 for Literature
Circle Number 35 for Literature and Rep Contact

INSTRUMENTS & SYSTEMS DIVISION
Together...we'll create tomorrow.

BAUSCH & LOMB

SPECIAL REPORT

“Networks offer the option of leaving messages for a friend, and providing news, financial information and other services.”

COMING ON-LINE

(continued from page 37)

municate on an informal basis through electronic bulletin boards, for example. The novelty of leaving a message for someone you've never seen before has some of the same appeal as pen pals or ham radios.

Through this informal communication, the commercial aspects of computer communications were quickly perceived by larger corporations, many of which were already involved in the dissemination of information via more traditional means. The last 18 months has seen an incredible increase in these services, and a significant widening of data available through them. A veritable smorgasbord of information and entertainment is now available with one or two pieces of hardware, some communications software and a telephone line. The personal-computer user can then access a world of information, making his computer as valuable to him as it is to the data-processing expert for an airline company or bank.

Technology touches home

Since the basic medium for data transmission is the telephone line, and barring any unforeseen developments like inexpensive lasers or satellite dishes in everyone's backyard, these lines, and the telephone companies, will play a major role in communications-via-computer.

However, using the telephone lines has some distinct limitations on the format and speed with which all of this information can be sent. Although the telephone lines are quite limited in the frequencies they can carry, 300 to 3000 Hz, this does not present a problem for voice communication, but can cause difficulties when transmitting digital signals.

To solve this problem, computer manufacturers studied the technical aspects of communications because technical limitations have deter-

mined, to a great degree, why communications hardware and software are configured the way they are. But before the data could be transmitted across the telephone lines, some agreement had to be made on just how the information would travel. So, using the binary code of "0" and "1," which is endemic to computers, two frequencies in that 300 to 3000 Hz range were selected, each representing one of the digits. This basic agreement would allow the phone lines to be used for data transmission with the expectation of uniformity and unscrambled information.

However, a device was still required to take the binary impulses of the computer and convert them to the standard frequencies for data transmission. Enter the modem.

Of course, Ma Bell was instrumental in seeing some form of standardization come about in communications, because she was, in effect, the only game in town. Thus came the Bell 103 standard which simply specified the frequencies that *everyone* would use for data transmission. At the same time, the phone company determined that so-called "full-duplex" transmission, which can take place in both directions over the line, would be the standard for the industry because a different set of frequency pairs comes into play for transmission and reception. (Some networks operate in half-duplex mode, but they're not as common.)

An additional operational benefit of the full-duplex concept is that the information sent is "bounced back" from the receiving end, before it's displayed on your own terminal. This allows for information "double-checking" to prevent errors; the half-duplex mode does not.

After the standard frequency was set, the speed of transmission, or baud, had to be decided. (Basically a baud is one bit per second.) The standard, once again set by the phone company, is 300 baud, or 30 characters per second. There is an option

to go to 1200 baud for really high-speed transmission, but the rates are more expensive.

Taking the frequency and speed of transmission standards into account, computer equipment manufacturers developed a device, called a modem, short for MODulation/DEModulation, that would make computer communications possible and practical. The first part of the title, modulation, refers to the modem's capacity to take binary code and assign the correct frequencies to it so the telephone lines will carry it. Demodulation is the decoding part of the operation, in which the frequencies are converted back to the binary code at the receiving end.

Quality, not quantity

In the development of communications, the first modems were "hard-wired," using either a dedicated phone line, or having direct connection to an outside line. Electronic amplifiers were used to pick up and decode the signals, and other pieces of hardware were added to the system, allowing for greater concentration of data, sometimes up to 256,000 bytes at a time.

For the personal-computer user quantity is not as crucial since the amount of data to be sent is well under 10,000 bytes. The large and expensive modems of the mini-computer were hardly necessary, so the first modems that appeared for the personal computer used a different approach—a small device that cupped the two ends of the phone receiver for the purposes of converting the tones. This "acoustic coupler," as it is termed, offers the user significant cost advantages, but is also subject to room noise and electrical interferences. But data can't be blindly sent from station to station, because computers don't always speak the same language.

Since data communications required the acceptance of certain standards for transmission, not only

in the telephone lines but in the computers themselves, standards were also needed in the field of communications software, so computers would have a common language. And, if for no other reason than because of its reputation, IBM developed the needed standards, or “protocols.”

Firms involved in the development of modems for personal computers include Hayes Microcomputer Products, which offers a direct-connect modem with automatic answering and dialing for \$279; Novation, which makes both direct-connect and acoustic-coupler modems; and Bizcomp, which produces direct-connect modems.

With modems as a starting point for computer communication, some specific I/O modifications are also needed to communicate with a computer. This is accomplished using the RS-232-C interface, which is a standardization of connectors, cables and signal voltages for personal computers. The RS-232-C interface is then used with special communications cards that plug into the computer's bus, and these are available both from the manufacturer, and as an aftermarket item. The cards recognize all the necessary communications protocols that must be dealt with before the actual communication can take place.

Making introductions

What a protocol does is introduce one computer to another, using “hello” and “ready to transmit” and “ready to receive.” Such routines are referred to as “handshaking.” Once these diplomatic preliminaries are out of the way, the actual communications can begin. Much like a utilities disk, the software sets the stage for the main act of data transmission.

The trend in software development is to combine communications software with other functions to create a truly integrated software package.

The software comes on either a separate disk, or as a piece of plug-in firmware for systems such as the Atari. Most of the communications software is proprietary; when you subscribe to a specific communications network or an on-line retrieval service, you get access to their software, which allows you to access their system. In some cases, the process entails dialing the access number without specific software instructions; but in most cases, some type of software linkage is required to get the computer on-line and up and running.

Foreign exchange

For the personal-computer user, the information available in the networking system comes from several sources. Primary among them are the three major commercial on-line database retrieval services: The Dow Jones News Retrieval Service, owned by Dow Jones; The Source, a subsidiary of Reader's Digest; and CompuServe, owned by H & R Block.

In addition to the three major networking services, the ability of telephone lines to transmit data has influenced other firms to enter the information market. Companies such as Times-Mirror and Knight-Ridder are exploring the possibilities of bringing news and shopping information into the home via teletex and videotex.

Both videotex and teletex have been in wide use in Europe and Canada. Teletex offers strictly one-way communication—compiled information is transmitted consecutively; the user can call up a page and have it displayed on the television screen. This system does not offer the user a chance to go back and find additional information beyond what's in the system. Videotex, on the other hand, is interactive; the user can request information for which the system searches and eventually produces. But the bigger the data

bank, the longer the search will take.

The British Prestel system is one of the most widely used and tested videotex systems, but the current American videotex system, developed by the phone company, is incompatible with that of the British. Instead it is compatible with the French Antiope system, and with its cousin, the Telidon, used in Canada. Until all of the technical snags are worked out, it is unlikely that a common videotex format will be in use in the United States.

But whether it's through a computer network or videotex, the range of information and services available to the personal-computer user is basically the same. Some of the most common services are:

- **News and information.** One of the staples of computer communication for the home or business will be news and information. Dow Jones, for example, has access to news from the *Wall Street Journal*. News summaries in 80 categories, covering some 6000 companies, can be accessed through the news retrieval service. Also available are *Wall Street Journal Highlights*, an electronically delivered summary of the *Journal*.

The Source provides access to the United Press International's wire-service news reports. Subjects can be referenced every day so any story that mentions President Reagan, for example, can be displayed, and a user can further narrow down the topic to suit his specific interest.

With teletex or videotex, news summaries from such major papers as the *Los Angeles Times* and *The Dallas Herald* are available.

- **Retail shopping.** This is the element of computer communications that is influencing Americans to accept videotex. The fact that Sears, Roebuck put on Videodisk its most recent 1981 catalog is a good indication of how easily major retailers such as Sears, Bloomingdale's, J.C. Penny, Wards

THE IBM PERSONAL COMPUTER

manages your company's
finances with



Executive Accounting System

**The comprehensive accounting program
with general ledger, accounts receivable, and accounts
payable modules.**

**The system is fully integrated, designed for small- to
medium-sized businesses requiring full reporting capabilities,
maximum friendliness, and expandability.**

The software is

**NOW AVAILABLE AT
PARTICIPATING COMPUTERLAND® STORES
AND OTHER AUTHORIZED IBM
PERSONAL COMPUTER DEALERS,
NATIONWIDE**

*The undersigned is pleased to announce
its adoption and full marketing support of this new
addition to its product family.*

THE DENVER SOFTWARE COMPANY

Manufacturers of superior software for personal computers
including the Financial Partner,[™] the Pascal Tutor,[™]
and the Pascal Programmer.[™]

Generates Complete Financial & Management Reports

Prints Invoices, Statements and Checks

Entirely Menu-Driven

Multiple Company Use

Expandable With Add-On Modules

Partial and Manual Payments

Flexible Accounting Periods

Fast Access to Information

“Computerland” is a registered trademark of Computerland Corporation, Hayward, California.

“Protocols introduce one computer to another, referred to as ‘handshaking.’”

and others can use videotex to offer catalog items for sale. All the user has to do is input his request on the computer keyboard, and the purchase is automatically put on a credit card and readied for shipment.

Commercial data bases such as The Source offer retail buying for items such as video cassettes and records. Discount-price purchases can be made using credit cards, since the retail transaction doesn't require a salesperson.

● **Communications.** Electronic bulletin boards have given wine lovers, environmentalists, businessmen and fledgling programmers the opportunity to leave messages, or communicate in real-time with others in different parts of the country who share the same interests.

Messages can be sent and stored, even if the receiver is away from the computer, or is busy (one of the distinct advantages the computer has over the telephone). If an immediate dialogue is required, the two users can communicate with each other, and can obtain a hard-copy printout of the conversation, which is an advantage for the businessman who may need a record of what was said.

● **Electronic mail.** Electronic mail is of particular importance to the businessman who wants instantaneous communication. As in a communications mode, messages can be sent virtually anywhere there is a computer network, and can be stored for the recipient's review. A salesman out in the field, for example, can come back to his home or office, sit down at his computer, and review all the messages that arrived when he was gone. Electronic mail can also take place during real-time if both ends of the communication are on-line.

A future benefit of electronic mail is the ability of the sender to follow up the electronic message with tangible messages such as mailgrams. Since Western Union already uses the phone lines, plans are underway to develop a Mailgram capability

for electronic-mail considerations.

● **Home banking.** This is probably the second major application for videotex, and programs are already underway in Minnesota and North Dakota to test the viability of a videotex-based home-banking system. The fact that the American public is being conditioned to accept computer banking through the 24-hour branch-banking terminals indicates that they will accept home computers as remote transaction terminals as well.

With videotex, any number of banking transactions can be accomplished—transfer of funds from checking to savings, payments of installment loans or credit cards—all with a few keystrokes. Business banking functions such as payroll can also easily be accomplished via videotex and computers, and the transaction is essentially paperless. Only in specific instances, such as when a receipt for a retail purchase is requested, would paper even be needed. This holds distinct advantages for institutions plagued with too much paperwork, which is one reason why so many large corporations are watching the first videotex tests in the U.S. so anxiously.

● **Travel and dining.** Information banks such as Data Travel or USREST from The Source offer travelers information on hotel accommodations, restaurants and flight schedules. Using this information, computer users can often function as their own travel service.

● **Entertainment.** Information services offer users reviews of current movies, and allow them to play arcade-type games. Additional functions for networking services include a job-hunting service, “how-to” courses in everything from foreign languages to home repair, and even a barter service provided by The Source for those who wish to trade for products or services.

The availability of these on-line data bases is limited only by budget,

and the imagination of the provider. In addition, the offerings of the major firms continue to broaden monthly. As the competition for subscribers heats up, major information/utilities services will attempt to offer more and more services to the end user.

If the price is right

But access to these services will have its price. How much it actually costs will basically be determined by how often the computer is used as a communications terminal.

The major information/utilities charge a one-time membership fee, usually in the neighborhood of \$100, which covers registration, documentation and password assignment. There are also connect charges each time a user “dials up” and goes on-line for information, and the rates can vary dramatically.

The Source charges a rate of \$18 per hour for basic information and communications services between 7 a.m. and 6 p.m., but this rate drops to \$5.75 an hour between 6 p.m. and midnight, and dips even lower in the early morning hours. The charges are considerably higher if a user connects to a value-added service from The Source, such as programing aids and manipulation of files.

Other potential charges can apply to storage of accounts and files. Thus, if constant access to an on-line data base is required, a user can easily wind up paying the equivalent of a hefty telephone bill in communications charges. So it makes sense to consolidate access time, and make the best use of the information available.

Videotex is still rather new, so a final pricing structure for a service that has not yet become available on a widespread basis is premature. Estimates run anywhere from \$30 a month on up, but these costs would be all inclusive (except for the charges the user incurs directly in retail transactions). The actual price

(continued on page 155)

Managers! Increase Your Productivity With a Radio Shack TRS-80® Computer

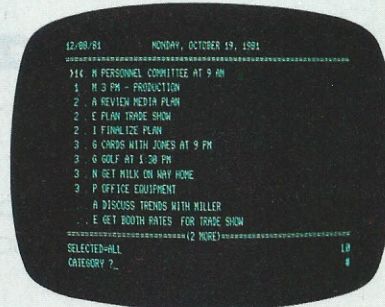
Here are two new management tools that will let you spend more time managing and less time "pushing a pencil." Our Time Manager™ program helps you organize your busy schedule, showing appointments and a "to do" list. It can be your daily organizer, filing system, electronic "notepad," project coordinator, financial assistant, and more. VisiCalc® lets you solve problems, forecast, and analyze the effect of your decisions. And both programs are available for the Radio Shack TRS-80 Model III Desktop Business Computer.

Time Manager: Your Daily Calendar . . . and More! This "electronic" calendar, automatic reminder and filing system places at your fingertips the important facts you need to plan, organize, schedule and record your business activities.

It's Easy to Use. As names, appointments, telephone calls, expenses and more occur, enter them into Time Manager. Now they can be instantly recalled whenever needed. You can view today's activities—or look ahead at what's coming up, summarized by priority. In addition, a "to do" list will even follow you from day to day until finished.

Locate Information Quickly. Using Time Manager, you can scan your year's data for specific information by category and/or keyword. For example, if you select the telephone category and a keyword—such as a person's name—then enter a range of dates, Time Manager instantly locates the calls you made to that person during the designated period, along with your notes concerning each call.

Track Projects, Customers, and Finances. You can get a complete picture of jobs or clients just from the daily activities information you enter. Review schedules and progress, examine the frequency of sales visits, recall all your business expenses at tax time, create financial summaries, and much more with a few simple keystrokes!



VisiCalc: The Manager's Planning Tool. Radio Shack's TRS-80 Model III VisiCalc dramatically improves the way you do financial planning, budgeting, sales projections, job costing, engineering designs, scheduling, product pricing, and more. Think of VisiCalc as an "electronic" columnar pad. Just define the formulas, enter your figures, and VisiCalc performs all calculations and automatically displays the results. Now change any value or formula on your worksheet, and VisiCalc *instantly* updates every related number! You can view countless "what if . . ." situations in seconds, rather than the hours required with pencil and paper.

We Have Other Ways to Save You Time. Discover electronic filing, word processing, and the many other ways a TRS-80 can increase your productivity! See the 48K 2-Disk Model III (\$2495), Time Manager (\$99.95), VisiCalc (\$199), and our other business software at a Radio Shack store, dealer, or Computer Center near you today!



Radio Shack®
The biggest name in little computers™
A DIVISION OF TANDY CORPORATION

Send me your free TRS-80 Computer Catalog.

Mail To: Radio Shack, Dept. 82-A-417
1300 One Tandy Center, Fort Worth, Texas 76102

NAME _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____

Retail prices may vary at individual stores and dealers.
™ Time Manager is a trademark of Image Producers, Inc.
® VisiCalc is a registered trademark of Personal Software, Inc.

Seaworthy Computers Make For Smooth Sailing

In the pursuit of escapism as well as America's Cup, sailors are discovering that the personal computer can serve as a vital second mate in sea navigation

by Jeffrey Rothfeder

If Ponce de Leon had had a personal computer aboard his ship in 1513, he might have found the way to the Fountain of Youth.

More than 400 years later, modern-day sailors are discovering that, with personal computers as their handmaidens, they are freed from tedious—and imprecise—manual calculations and can more fully partake of the joys of ocean sailing. In fact, these machines have brought such precision and ease to the navigator's tasks of charting direction and monitoring position that there may be no turning back to traditional maritime ways.

As Dick McCurdy, a long-time sailor and maritime computer designer puts it: "It is certainly spoiling navigators. With the on-board computers, now they're not satisfied unless they know they are within 200 feet of their correct place of position." Manual calculations have been known to produce distance figures that are off by as many as four miles.

Navigational software and systems has a thriving and growing market in this country's current thirst for leisure activities, at a time when sailing is increasingly gaining in popularity as an escapist pursuit. Personal computers from companies such as Tandy, Apple and Hewlett-Packard, as well as customized systems using Data General and Digital Equipment Corp. hardware, are being plugged in

to take the drudgery out of guiding a boat.

All the systems, whether they are intended for speed-racing yachts or pleasure cruisers, are basically alike in what they offer the mariner. The most important calculation the computer can do is known as dead reckoning. This approach takes into account the boat's speed and the direction in which it has been traveling, to determine exactly where the boat is at any given instant. When dead reckoning is figured manually, it is a tedious process that requires constant refiguring with each attempt to define position. The personal computer's advantage, of course, is its ability to continually—second by second—

update its memory bank as the boat proceeds; information on the boat's position on the ocean is available to the navigator at the push of a button.

Calculating with stars

In addition, as a secondary position-placing procedure, most of the available programs also calculate by using celestial navigation. Simply put, this entails the drawing of a specified triangle that connects the horizon, a fixed spot in the sky, and the sailboat. Again, done manually, this is extremely time-consuming and takes away from the attention that a navigator can devote to the rig.

Beyond these two basic navigational tools, many of today's systems

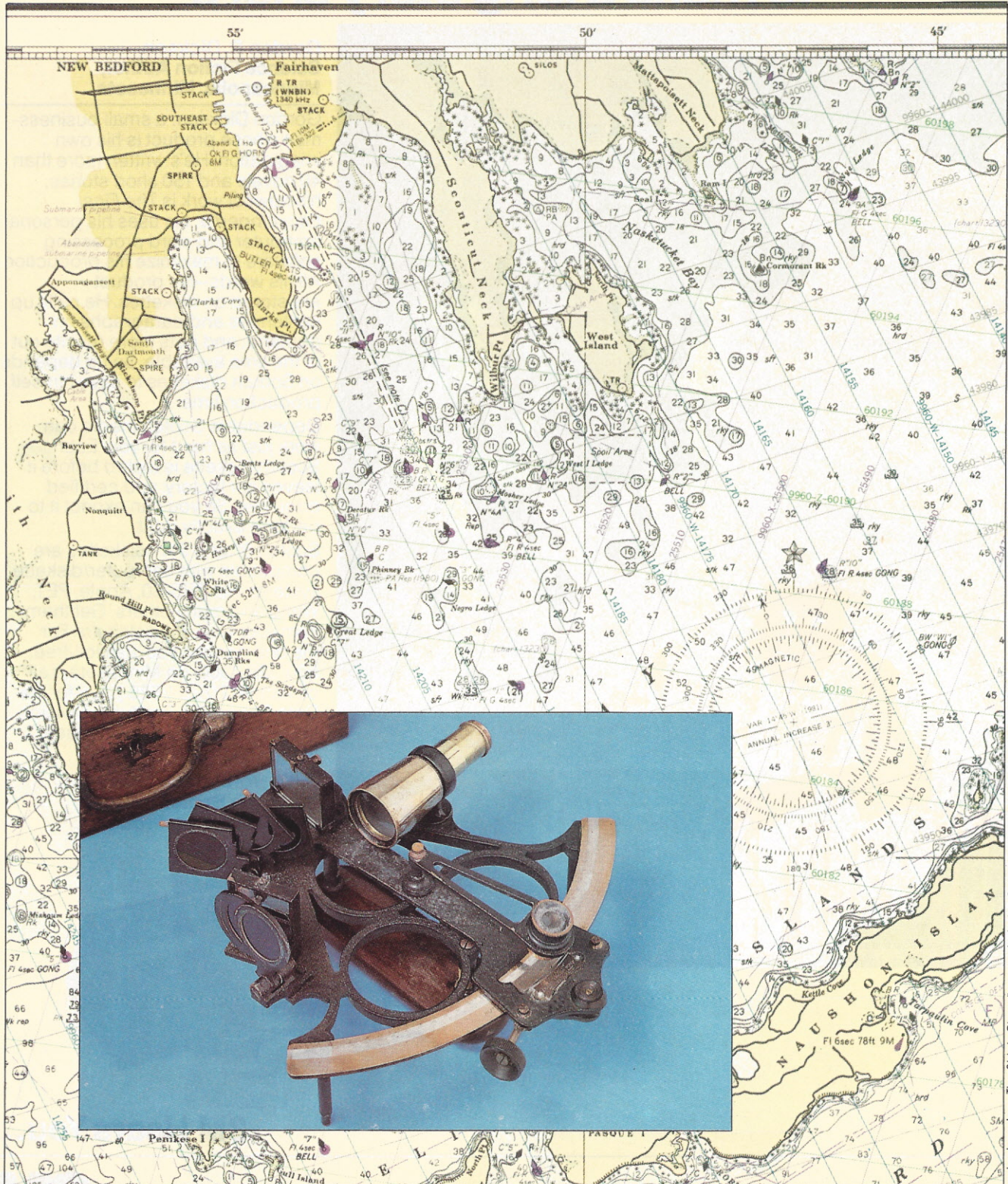


photo by Christopher Cunningham

Jeff Rothfeder is Associate Editor of *Personal Computing magazine*.

Skippers of the *Courageous* and other America's Cup racers were pioneers in small-computer-assisted navigation.

“He makes sure that the hardware and software do not intrude on that special relationship between a good sailor and his boat.”



sextant courtesy The Strip's Chandlery photo by George B. Fry III

"My computer helped me write The Final Encyclopedia. I wouldn't trust anything less than Scotch® Brand Diskettes to make a long story short."



Cover art by Michael Whealen, courtesy of Ace Publishing Co.

**Gordon R. Dickson,
Science Fiction Author,
Minneapolis, Minnesota**

Gordon Dickson: a small businessman whose product is his own imagination. He's written more than 40 novels and 150 short stories; his newest work is *The Final Encyclopedia*. He uses his personal computer and word processing software to maximize his production. All his words—his product—are stored on diskettes. He calls up sentences and paragraphs on demand, and gets more rewrite out of the time available. So he depends on Scotch diskettes to save himself production time.

Dependable Scotch media can work just as hard for you. Each Scotch diskette is tested before it leaves our factory, and certified error-free. So you can expect it to perform exactly right.

Scotch 8" and 5¼" diskettes are compatible with computer/diskette systems like TRS-80, Apple, PET, Wang and many others. Get them from your local 3M distributor. For the one nearest you, call toll-free: 800/328-1300. (In Minnesota, call collect: 612/736-9625.) Ask for the Data Recording Products Division. In Canada, contact 3M Canada, Inc., Ontario.

**If it's worth remembering,
it's worth Scotch
Data Recording Products.**



3M Hears You...

3M

"The computer won't tell you how to make the boat go faster, but it is a report card of your performance as a sailor."

contain other, more extravagant features. But for hundreds of years, and still today, celestial navigation and dead reckoning have been the navigator's two most relied upon methods for ascertaining his boat's place on the ocean plane.

Much of the hands-on experimentation and development of computerized navigational systems took place over the last decade, during the triennial America's Cup races in Newport, R.I. McCurdy calls these events "a very visible laboratory—the only yachting race that pits the entire sailing technology of one nation against another's." And McCurdy was one of the first to take advantage of this laboratory.

As a sailor and a computer engineer, McCurdy decided in the early 1970s to put his talents to marrying the thinking machine to the sailboat. Because one of his mentors was Bill Cox, the skipper of the American Eagle, which raced in 1964, it was natural for him to get involved with designing systems for the America's Cup yachts.

The first appearance of digital computers on the racing boats was in 1974, when McCurdy developed a navigational package for the Courageous, which won the race that year. Using a Data General computer—"I sweet talked them out of the hardware in return for publicity for their product," he says—McCurdy designed a system that took information directly from on-board instrumentation and calculated the boat's true position by dead reckoning.

No time wasted

Though McCurdy freely admits that in 1974 the computer lacked something in the way of efficiency—it failed 25 percent of the time—he labels that year's experiment a success, especially because the equipment worked with the boat's instruments and did not require manual input of data. "The bottom line for these

yachtsmen is winning the race, and the Courageous won that year, so it was a success," he says. "But it is vital, particularly on these 65-foot yachts, to make the computer input for itself. Everybody on board is so busy that there is no time to waste putting information into computers."

With a victory under its belt, computerized navigation is now given on all the America's Cup boats. But many of the sailors recall that they did not immediately take to the machines. In fact, for most, the first reaction was if God intended a 65-foot yacht to have a computer on board he would have originally built the boat that way. But on each yacht there was a come about that turned mistrust into acceptance.

Bill Gorsch, the navigator on Courageous in 1977 and 1980 and a computer designer for Grumman Corp., remembers that while he was looking forward to using a DEC personal computer for dead reckoning, the boat's captain, Ted Turner, was initially skeptical. But a crucial human error in 1977 changed Turner's mind.

"There are times when all manpower is needed for sailing chores such as tacking," Gorsch says, "and a navigator has to leave his navigation responsibilities and become a sailor. During one such instance that year, when I got back to navigation, I couldn't quite find the correct spot to veer the ship."

This would be similar, he says, to driving down a street and knowing that the house you're looking for is on some road to the right, but not being sure which turn you should take. "As it turned out, we had sailed one block further than we should have, while a competing boat turned down the correct street. If we had the computer on during that time, its dead-reckoning function could have told us exactly where we were. It was a crucial error and it made a believer out of Turner."

Gorsch adds that by 1977, the problems with computer efficiency

on the Courageous cleared up. "Not once did the machine hiccup," he says. "I was very impressed by this, considering the harsh, wet environment on the yachts during the races."

Trickle-down theory

What followed the personal computer designs used on the America's Cup boats is a classic case of trickle-down electronics. Smaller, but in most essential ways, similar versions of these navigational systems are increasingly being readied for smaller sailboats. And familiar names in sailing circles are joining the market. McCurdy, one of the first to work with computers on the racers, recently co-founded Okham, Inc. (Gilford, Conn.), which is about to release a sailing system using the TRS-80 Microcomputer to compute dead reckoning and true wind. Moreover, other custom houses are making navigational software.

But Hewlett-Packard was the ground-breaker in placing personal computers on sailboats other than America's Cup yachts. Going by the tenet that the purpose of computing is insight, not numbers, the firm in 1980 released a navigation module that can be plugged into its HP-41C programmable calculator. (Earlier HP designs were available for previous generation calculators.)

The software is wide-ranging, including a perpetual almanac that spans 20 years, a star guide, celestial navigation and dead reckoning. As an example of the breadth of Hewlett-Packard's sailing package, the celestial navigation program uses all 57 mariner's stars, Polaris, the Sun, Venus, Mars, Jupiter, Saturn and the Moon as the relative fixed points to compare with the horizon when calculating current position. While many more experienced sailors could possibly eschew this method of place-finding, celestial navigation is considered to be essential to small-boat captains as a backup to confirm the accuracy of dead-reckoning results.

Why does EDU-WARE bother

to delve into the educational needs of today's society?

Because at Edu-Ware, we are scientists on the frontiers of instruction. Our concern is with finding the best ways to communicate the knowledge needed and the tools to use it.

Edu-Ware is not interested in creating solutions to chase nonexistent problems, but in applying its technology to core curriculum areas for which demand exists today.

In 1981, Edu-Ware established 97 evaluation sites at schools and universities across the country, making a major commitment to research of CAI (Computer Assisted Instruction) and other instructional technologies. The project is the first step in establishing a national board, which will review standards of performance and quality for instructional systems in the United States and abroad. This project helps Edu-Ware to find a better way.*

Edu-Ware's Instructional Designers apply their tools to the development of learning

software systems, establishing an ease and effectiveness with which the microcomputer can become a part of the classroom and enhancing the learner's performance.

The professional programming staff at Edu-Ware takes CAI beyond simple text-page displays and converted school book formats. Working to a script



prepared by an Instructional Designer, the programmers construct learning software in which parents, educators, and learners can have confidence.

Ultimately, the Science of Edu-Ware is measured in its results, in what Edu-Ware offers parents, educators, and learners: a better way.

At Edu-Ware, Instructional Designers work together to develop learning software strategies.

*For details about the Test Site Project, contact Edu-Ware.

School purchase orders welcome.

EDUWARE®

The Science of Learning™

Edu-Ware Services, Inc. • P.O. Box 22222 • Agoura, CA 91301 • (213) 706-0661

CIRCLE 10

“Computers have brought such precision to charting direction that there may be no turning back to traditional maritime ways.”

The HP system has generally received high marks and universal praise among sailors for its usefulness, but it also received a dose of notoriety at the hands of William F. Buckley Jr., the author, and publisher of *National Review Magazine*, in his book *Airborne* (MacMillan, 1976).

Praise versus problem

Buckley was using the HP navigational module on his yacht, *Cyrano*, during a run to Bermuda, and found that the dead-reckoning position the computer preferred was consistently off by as many as 30 miles. In frustration, he resorted to manual calculations, and vowed to take the issue up with Hewlett-Packard upon his return home.

Back on land, three weeks later, he spoke to both William Hewlett and David Packard about his sailing problem. And after being passed through the chain of command at the firm, he was finally contacted by Newcomer, the navigation module's designer. But according to Buckley, he couldn't understand the scientific jargon that Newcomer used to explain the machine's failure nor his description of how to make it work right. Taking the situation into his own hands—but not before a one-page tirade against the technological newspeak which he says pervades instruction manuals—Buckley, in *Airborne*, included a simple, step-by-step procedural outline detailing how to get the most out of the HP navigation package.

Still, despite his problems with the dead-reckoning program, Buckley adds that the other programs—the almanac and the various celestial tables—were reliable and neat. And there is a postscript to this incident. According to Newcomer, the computer wasn't at fault, but “the problem Mr. Buckley describes [in the book] was the result of his misplotting the correct result that the computer gave him.”

This error illustrates the main difference between Hewlett-Packard's programmable-calculator navigational package and those offered for use on personal computers such as Apples and TRS-80s. Personal computers take relevant data automatically and directly from the boat's instrumentation, while an HP user has to input information manually and then chart position—also by hand—based on the calculator's output. These extra steps increase the chance for error.

In addition, the personal computers, because of their larger memory, provide a constant log of a sailor's journey; he can refer to the log to compare his performance at different climatic and time-of-day conditions.

“It won't tell you how to make the boat go faster,” McCurdy says, “but it is a completely objective report card of your performance as a sailor in various situations. The computer can record a whole range of information off of the instruments, store it away, and analyze it when you want it to. It can be used for more than just calculation.”

Logic or guesswork?

Gorsch, the Courageous navigator, adds that, with a computer on board, so much of sailing that used to be guesswork and estimation becomes the province of logical thought and mathematical expression. “Let's say that at two o'clock yesterday the ship was running at its best. The computer has on record the tacking strategies, wind speed, etc. that occurred at that moment. Next time I encounter similar conditions, I can punch up the computer and it will describe, in a simple ratio, what I have to do to duplicate my performance.”

HP officials, noting the gap between their calculator and the larger machines, feel that the differences will be bridged by the firm's recently released Interface Loop, which allows its hand-held machines to tie directly into instrumentation of all

types, including that found on boats. In fact, Newcomer envisions a future where the programmable calculator will be so integrated into the boat's system that, by alarm, it will wake the sailor up in the morning; give him a list of the stars that are in the sky at that hour, his current position and the speed he is traveling; and inform him of the time he should change direction, based on a map of his journey.

Still, though the computer has become an essential tool for a boat's positional reckoning, its place is somewhat threatened by other advances in electronics. A government system called LORAN, which was implemented during World War II and upgraded in the late 1960s, is becoming more and more popular with sailors as its equipment grows in sophistication.

LORAN is a set of transmitted signals that can be picked up by an on-board receiver, which then plots the boat's exact place on the ocean. But this system, it is felt, will probably never dominate the market because its scope is limited to within 500 miles of the shore, and at certain times of day, its signals become distorted. Also, most designers of personal-computer navigational products say that, as the sailor's needs are better defined, more complex and advanced mariner programs, beyond just reckoning software, will be developed to satisfy him.

The only blockades against the personal computer's increased use on sailing rigs are those borne of the quirks and personalities of the navigator's breed.

“Good sailors are very touchy,” McCurdy says. “They are used to making the boat go faster by using their six senses and vibrations in the air. The real trick for a computer designer working in this area is to make sure that the hardware and software he develops do not intrude upon that special relationship between a good sailor and his boat.”

Watch Sales Soar As Inefficiency Ebbs

Whether tracking sales or projecting them, analyzing data or criticizing closes, personal computers are becoming the mainstay of many a sales business

by Bill Suydam

Imagine this scenario: You have an opportunity to close a sale that will net you four times the amount of your average sale. It's going to be a tough close—four times as tough as usual.

A year or so ago, you would have doubted whether or not you could pull your presentation together before the buyer went elsewhere. Today, because your computer is doing your dirty work—rapidly tabulating and generating the needed reports—you *know* you'll close the sale. You're prepared.

And being prepared is as important to salespeople as it is to Boy Scouts. Nevertheless, the use of personal computers for sales preparation is not happening as fast as it might, primarily because software developers are having a hard time of it: Since every company has its own method of handling sales data, the software folks are discouraged from writing canned programs. Result:

Bill Suydam is a free-lance writer from New Jersey, and a frequent contributor to Personal Computing.

The availability of sales software has been limited to those companies that could afford to have it custom-written. Less fortunate companies have had to make due with the sales data generated by standard accounting packages.

But fear not. This situation is beginning to change, as the availability of affordable personal computers generates a broader potential user base.

The three main areas where computers are clearly useful in sales applications are for generating or tabulating leads; aiding the sales representative in closing sales; and in analyzing sales data for a better understanding of individual and company sales performance, consumer preferences and advertising effectiveness.

The bingo blitz

Marsha Sutton, owner of Sutton Communications in San Diego, Calif., worked in marketing for computer and electronics firms for several years, and noticed one peculiar shortcoming in all of them: While

these companies were on the leading edge in electronics technology, they were all manually processing their "bingo cards." These cards allow magazine readers to request product information from many sources on a single postcard.

But Sutton observed that the product information requests were generally handled inefficiently at these companies. Consequently, consumers had often already decided upon alternate purchases before even receiving requested product information.

The result of Sutton's interest in this problem was an inquiry-handling service, which she calls "Bingo." Based in San Diego, and operated by her company, Bingo takes the inquiry lists provided by the magazines, enters the information into a TRS-80 Microcomputer Model II for storage via two 8-inch floppy disk drives, and supplies mailing-label and report printouts from a Texas Instruments Model 810 printer. The requested literature is then mailed to consumers, and the company receives a list of the people who requested the information.



1982 **“How much will you
have to reduce the price
before it sells?”**

Sutton's service is ideal for companies that generate less than 1000 such literature requests per month—not an economical figure to operate their own, in-house facility. The service provides a one- to two-day turnaround for mailing out literature, which is extremely fast.

Sutton's service also sorts out data on consumers who request sales help or further information after receiving the initial literature. This information is sent to the company in question.

The advantages of computerized inquiry handling over manual sorting are clear to Sutton: “You have to consider the salary you are paying someone to manually sort inquiries and the timeliness of the literature mailing. With a computer, you give a timely response.”

Juggling sales prospects

Once a sales representative has obtained leads, the personal computer can be used to enhance his sales effectiveness.

Randy Winters, an entrepreneur, first realized this potential usefulness for personal computers as a salesman in 1979, when he began developing a package, called Sales Pro, for use in his own day-to-day sales activities. Lifeboat Associates of New York liked the package so much that it contracted with Winters to be the sole distributor.

Winters has written not just a piece of software, but a sales method. A sales representative using Sales Pro can evaluate his prospects in

terms of the likelihood in percentages that he will close a sale. Winters has provided guidelines for applying the percentages. The program allows for input of the dollar value of the sales prospect, as well as the commission to be realized from that sale.

This information, combined with the number of working days per year and the salesman's goal for yearly dollar sales, is used to generate an automatic estimate of the total number of days the sales rep should devote to each prospect. The printout generated by the program is taken into the field to remind the sales rep of all the information entered for each customer, and notes can be jotted right onto the printout. As the sales rep updates his files weekly, using the printout as his notebook, the computer tells him how many days he has left to close a particular sale.

These computer data help salespeople determine the relative importance of closing a sale in relation to time. A salesman tantalized by a \$100,000 prospect might otherwise spend more time pursuing this prospect than it would take him to close sales on 11 \$10,000 prospects. “Spending too much time trying to sell to the wrong person is an all too common mistake made by many salespeople,” Winters states.

But perhaps more importantly, the computer helps the salesperson add a personal touch. When the program is being set-up, the user can define 12 questions to be asked about every new prospect. In addition, there are

nine areas for remarks, which are automatically dated when entered. With this “scratch pad,” the user can keep track of customers' products or service needs as well as the personal information about his prospects, such as noting why the customer does not like a particular product, and even the customer's wedding anniversary.

Follow it up

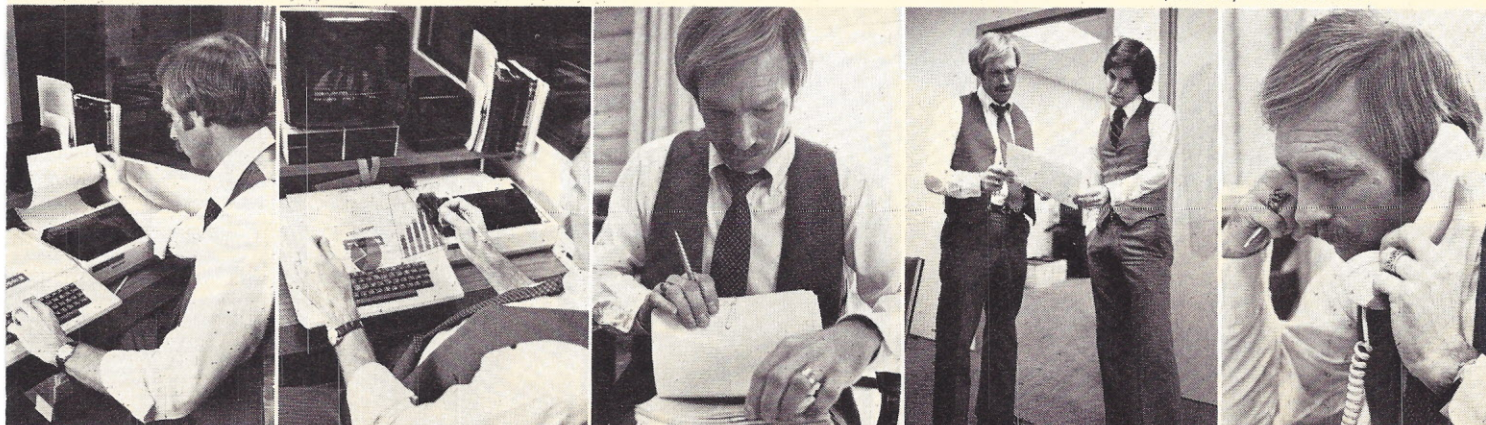
By helping Winters to keep closer track of prospects, Sales Pro has made him a more effective and successful salesman. “If you don't manage your qualified prospects correctly,” says Winters, “you're not going to make as much money. With Sales Pro I was able to double the amount of leads I could handle.”

Winters has found the personal computer especially useful for dealing with leads garnered during trade shows. Computer shows are a salesperson's dream in terms of the number of leads he can generate. But the dream quickly becomes a nightmare when he realizes the number of people he must remember and follow-up on. “You only have about two weeks to sell anybody after a show,” Winters states.

Referring to a trade show he recently attended, he adds, “We spent two days keying in all the leads from the show. Then we covered all the leads with the same ZIP codes that we had the highest chance of selling, and we covered more people than we ever had.”

“I can deal more effectively with more prospects at one time. As a re-

photos by © Lukowicz 1982



PROFESSIONAL/MANAGERIAL

NO SORCERY IN THIS SALES OFFICE

In a company such as ours, Hayden Publishing, salesmen are on the road more often than in the office. When they do return to home base, their personal computers are powered-on and the needs of the day are structured and met.

These salesmen are using their systems in applications that are as diverse as the salesmen themselves. They're monitoring their account records and analyzing the data therein. They now have the ability to scrutinize the details of each sales transaction and obtain specific information about their clients prior to making presentations.

These same presentations used to be backed with volumes of data that would take the prospect a weekend to wade through. But salesmen are now using their systems to convert this quantifiable information into charts, graphs and other visual devices that provide the prospect with nearly instant comprehension of perspectives and relationships.

In any sales scenario, businessmen must understand sales figures by product, department, division, month, quarter or year, region or territory. All of this data must be compared with future estimates based on economic indices and that industry's statistics.

So it is in publishing. Salesmen easily recover the necessary sales history, set up "what-if" scenes, and find out where they are and where they have to go. Presentations are finely tuned, and information vital to closing is literally at their fingertips.

sult, I have more time to do what I'm supposed to be good at—closing the sale. It has made me more money; it's that simple."

Sales success balloons

Sven Jensen, president of Seville Properties Inc., based in Los Altos, Calif., has discovered that systematic sales tracking and analysis can mean the difference between being a winner or just mediocre in his field.

Seville Properties took seven out of nine Los Altos Board of Realtors awards for sales in 1981. Jensen attributes this success partially to his use of experienced, ethical sales personnel and partially to his personal computer, which gives him ready access to much needed information.

Jensen uses an Apple II, with 48k, dual floppies, a Sanyo 9-inch monitor, the Apple silent printer, and an IDS 440 Paper Tiger printer for logging and analyzing the details of each sales transaction to obtain specific information about his agents at the end of the year. He also uses the computer for cash-flow projections. He plans to use the computer to do a study of mortgage financing.

"In the real-estate industry, we don't really know more than two or three months in advance what is anticipated for closing," says Jensen. "At the end of each month, we make a prediction about closings so that we know how much cash we've got coming in."

"I keep track of all the details of each transaction so that we can

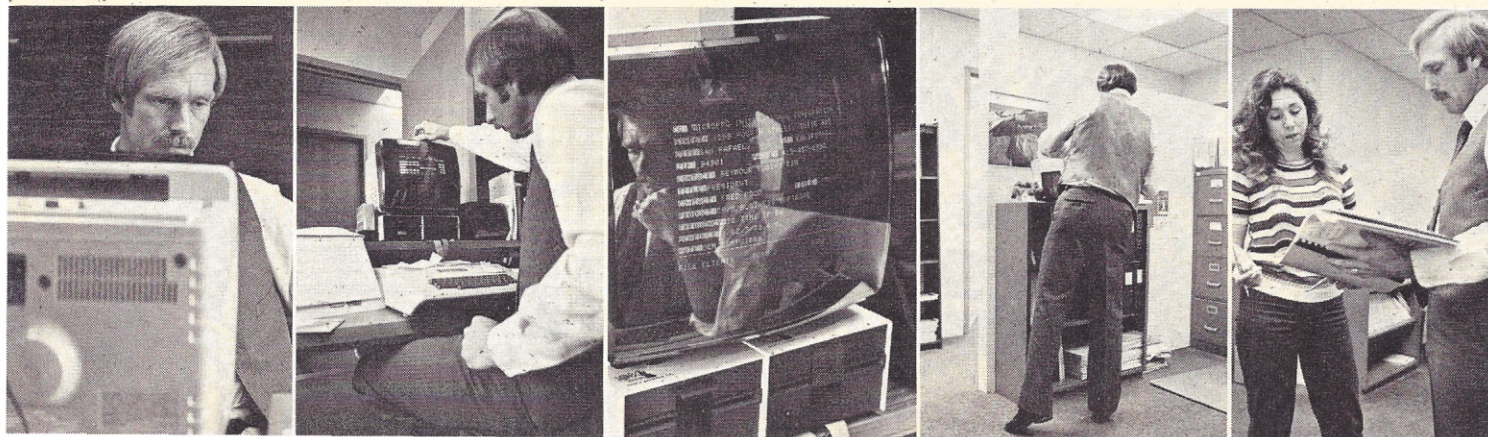
furnish the information to each agent at the end of the year. This includes what has sold, how much the agent was paid, the buyer, the seller, the date when the sale was closed, and other pertinent information."

The computer is also being used to determine how long a given property is on the market before it is sold, as well as how much the price of the property must be reduced before it sells. This information helps Jensen and his colleagues determine whether or not they are pricing their properties too high, and to check the relationship between a reduction in price and the length of time the property is on the market.

The agents are also provided with computerized information on sales sources. This information provides each agent with a profile of his sources of income.

Naturally, the Apple is pressed into service for bookkeeping and budget production as well. Through these applications, Jensen learned that his gross sales for 1981 were the same as for 1980, but that his expenses for 1981 went up drastically. For this reason, he is particularly interested in the information the computer can provide concerning how, in today's tough real-estate market, he can advertise most effectively.

Jensen also uses the computer to determine the break-even point for his costs per month, per sales desk. This allows him to keep track of which agents are making or losing money for the company. "If we have



"Dreams become nightmares when you realize the number of leads you must follow-up on."

an agent who is consistently pricing listings too high," he says, "we end up holding on to those listings for a very long time and having to do a lot of advertising before they finally sell. We can discover that relationship with the computer; and then tell the agent to list the property more realistically."

With 24 agents in his Los Altos office, and 24 more in his office in Menlo Park, it is well worth Jensen's while to watch his sales progress closely. "We have a much better handle on the control of expenses than we have ever had before. We can quickly discover if something is beginning to creep up on us; advertising certainly would be one of those things right now. And we have a better understanding of the sales contribution made by each agent to the company."

Candidates for computers

When O'Donnell & Associates Inc. of Neptune, N.J., linked up with a computer, it was the personnel agency's most propitious match. Dennis O'Donnell, the president of the agency, which specializes in placing highly-paid personnel for the computer industry, says the computer has helped his staff keep track of files. "Without the computer system here, we'd spend days as opposed to minutes trying to perform the necessary match. Plus, it allows us to get the administrative staff in the company more involved."

O'Donnell and his associates use a Zenith Z-89 with dual floppies and

an Epson MX-80 printer to keep track of active resumes and job openings. They are using turnkey software from Micro Information Processing Systems. The software runs under CP/M.

Searching files

"With the system," says O'Donnell, "we are better able to keep track of the active resumes on file. We can code an individual's contact information [address, phone numbers, etc.] and categorize the individual in terms of his skills. That information is put on file, so that when a client calls and describes his needs, the system will immediately search through the files and tell us who has the skills necessary to fill the job. We are also able to do this in reverse when someone wants us to market his background and experience to our clients."

O'Donnell estimates that the system has cut the time it takes to fulfill the needs of his clients by at least a factor of 10. This leaves the agency more time to go out and find new clients.

The agency also uses the computer to track revenues. "We operate on a cash basis, as opposed to accrual," O'Donnell says. "As we collect receipts from various clients, they are tracked and put into the system with our expenses, and the computer produces our financial statements."

The agency also performs sales-analysis functions for some of its clients. Using the internally generated reports supplied by client

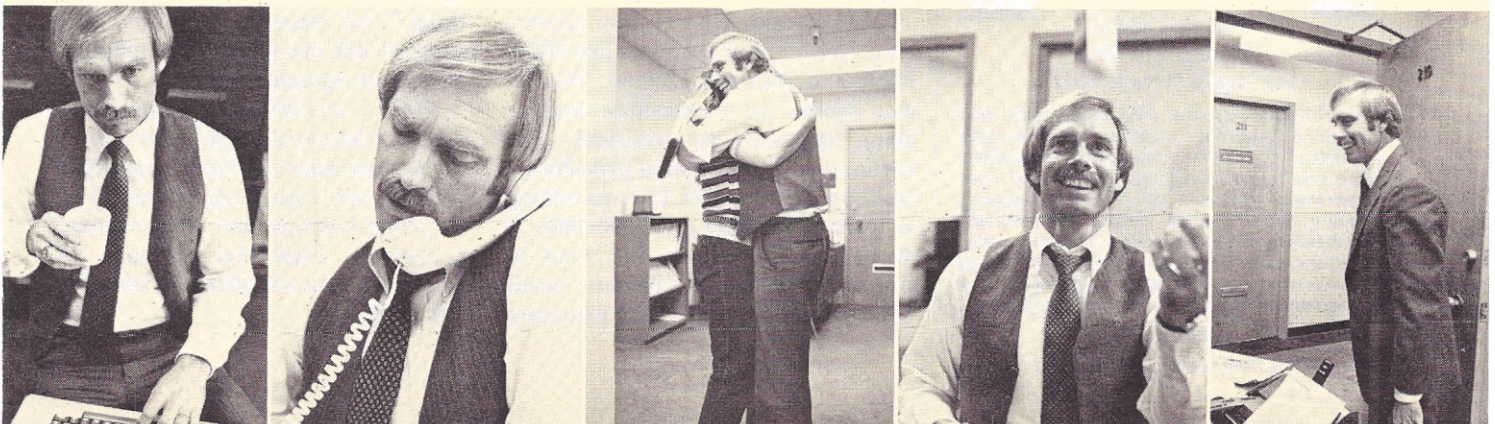
companies, O'Donnell & Associates analyzes the data using industry standards such as geographic densities of the marketplace, competitive factors and margin analysis.

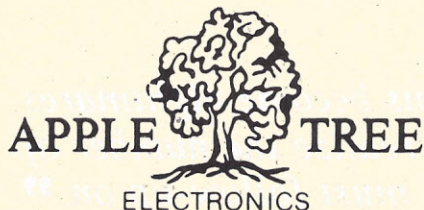
For example, one client wanted to analyze the relative benefits of selling its product through distributors instead of through large original-equipment manufacturers only. Although the basic opinions and decision-making were human in origin, O'Donnell & Associates discerned the costs of selling by each method by using the computer to make basic calculations—eliminating human error—and to help generate reports.

Ripe for analysis

Running a winery and vineyard is a capital-intensive business, as Bob Smith, a consultant in Berkeley, Calif., can attest. One of Smith's clients is a local winery, and Smith has installed a personal computer running PLAN80 (available through Lifeboat Associates) to help the winery do its financial planning. The winery must predict its cash flow—based on recent sales and past performance—to determine, for instance, what percentage of the grape harvest should be sold to other wineries or fermented on the premises to make wine.

All this analysis is being done on a Godbout S-100 system with an 8088 CPU, 64k of RAM, two 8-inch double-density disk drives, an NEC Spinwriter printer, and a Televideo terminal. PLAN80 is a program





A harvest of savings from Apple Tree Electronics!

SOFTWARE

A full line of software for business, games and education at **15% off!**

PERSONAL SOFTWARE	List	Our Price
VISICALC	\$200.00	\$169.00
VISIDEX	\$200.00	\$169.00
VISIFILE	\$250.00	\$212.00

HARDWARE

	List	Our Price
32K RAM card	\$293.00	\$205.00
Video Term	\$345.00	\$279.00
Lazer Products	— — —	20% off — — —

DISKS

Maxell	Box of 10, 5 1/4", SS-DD	\$35.00
Verbatim	Box of 10, 5 1/4", SS-DD	\$29.00

MONITORS

LE MONITORS	List	Our Price
9" Green	\$189.00	\$159.00
12" Green	\$199.00	\$169.00
ZENITH		
12" Green	\$179.00	\$129.00
Plus a full line of AMDEK Monitors		

PRINTERS

PAPER TIGER	List	Our Price
460G	\$1,094.00	\$950.00
560G	\$1,394.00	\$1,250.00
EPSON		
MX 70	\$449.00	\$395.00
MX 80FT	\$745.00	\$595.00
MX 100FT	\$945.00	\$795.00



(702) 452-5589



P.O. Box 18432
Department 4PC
Las Vegas, Nevada 89114

Phone orders welcome. Mail orders may send charge card number (include expiration date), cashiers check, money order or personal check (allow ten business days for personal or company checks to clear). Add \$3.00 for shipping, handling and insurance. Nevada residents add 5.75% sales tax. Please include phone number. All equipment is in factory cartons with manufacturers warranty. Equipment subject to price change and availability. Call or write for price list.

CIRCLE 108

PROFESSIONAL/MANAGERIAL

for constructing spreadsheet-type models that can be subjected to sophisticated manipulation for applications such as financial modeling.

Smith appreciates the user-friendliness of the personal computer. "The last thing you want to do with a little company like that is to saddle it with a data-processing department, or hire a programmer to keep the program functional."

Smith says he has also found applications in his own business for a personal computer and PLAN80. "I use the computer to raise money and make presentations to venture capitalists. That sort of environment changes from day to day. The changes are so significant that being able to change a few numbers and have a nice, new presentation available is enormously beneficial. It's a very, very powerful tool."

Not all happy endings

Not everyone has had a trouble-free experience with installing a new system, sadly enough. Ken Wall, president of C.K. Wall Co., a small-electronic-parts supplier in Verona, N.J., has advice for those who are selecting their first computer system.

First and foremost, advises Wall, avoid a system that does not support a common language such as COBOL, Pascal, or BASIC. "Proprietary languages shouldn't be touched with a 10-foot pole," he says. Most systems do support common languages, and any system that qualifies as a personal computer certainly does.

Wall speaks from bitter experience. With major accounts like IBM, RCA and Western Electric, Wall—who works as a salesman despite being the company president—was in the enviable position of considering money to be no object. He was willing to spend \$50,000 to \$100,000, if necessary, to obtain the kind of system he desired. His primary needs were to handle a 3000-item inventory

and keep track of 20 to 30 orders per day. He also needed a handy record of credit limits for his smaller customers, so that a clerk taking an order could tell instantly whether or not the customer was over his authorized limit.

Know the pitfalls

Wall explained his needs to a small custom-software house, which provided him with a system study. The study included a recommendation for hardware, but Wall was not satisfied with the service available in his locality for that manufacturer's machines.

He then took his system study to another hardware manufacturer, where the salespeople assured him that they had just the system for him. This system included 96k of RAM, a hard disk with tape backup and three terminals. Naturally, since the vendor's system ran its own special, high-level language, the software had to be custom-written. Wall's first unpleasant discovery was that the hardware salespeople "did not know that the CRTs would gobble up most of the memory"; the system was expanded to 128k.

After more than a year of software development, a major system crash left Wall's company without a computer. Rather than have the hardware repaired, Wall demanded that the computer vendor take it back.

"So here we are, \$100,000 later," he says, "on the verge of going to court, trying to terminate a contract (he had entered a lease-purchase agreement) and get rid of the whole thing." All because, he adds, "the supplier did not know the capability of its own equipment."

Wall's unfortunate experience need not be anyone else's—providing the system selected either supports a well-known operating system like CP/M or Unix, or that it has resident a common, high-level language for which there is considerable software available.



Many people think just because a computer does difficult things, it must be difficult to operate. Not so. At least not with PFS™ and PFS: REPORT.

PFS and PFS: REPORT let you concentrate on doing your work, not on working your computer. There's no complicated programming or computer language to learn. Using the PFS Series is so straightforward, you can learn it in as little as 20 minutes, and that's something both experts and beginners can appreciate.

Design your own management system, simply.

PFS lets you arrange your information in "forms" you design yourself. Once you've created your form—with spaces for all the necessary data—you simply fill in the blanks.

If you don't like the original form, PFS lets you change *just* the form, without having to totally re-enter the information on it.

To use your forms, just call up the information you want in a variety of ways such as "less than," "more than," "equal to," "between" or "not." You can even find specific characters, words, names or numbers. And PFS can also sort labels, change its

40-column format to accommodate larger printouts, and tell you how much room you have left on your disk.

Get more out of what you put in.

PFS: REPORT sorts, calculates, totals, formats and prints *presentation-quality* reports with up to 9 columns, in alpha or numeric order, with automatic entering and justification. With your information in this format, you can analyze it quickly to help spot trends, plan and make decisions.

A whole family of software for Apple® II and III.

PFS consistently ranks among the 5 top-selling business software packages for Apples. Because you can use it for almost anything—from chemical analyses to keeping track of your wine collection, from balancing your checkbook to computing your payroll. And there are more programs on the way.

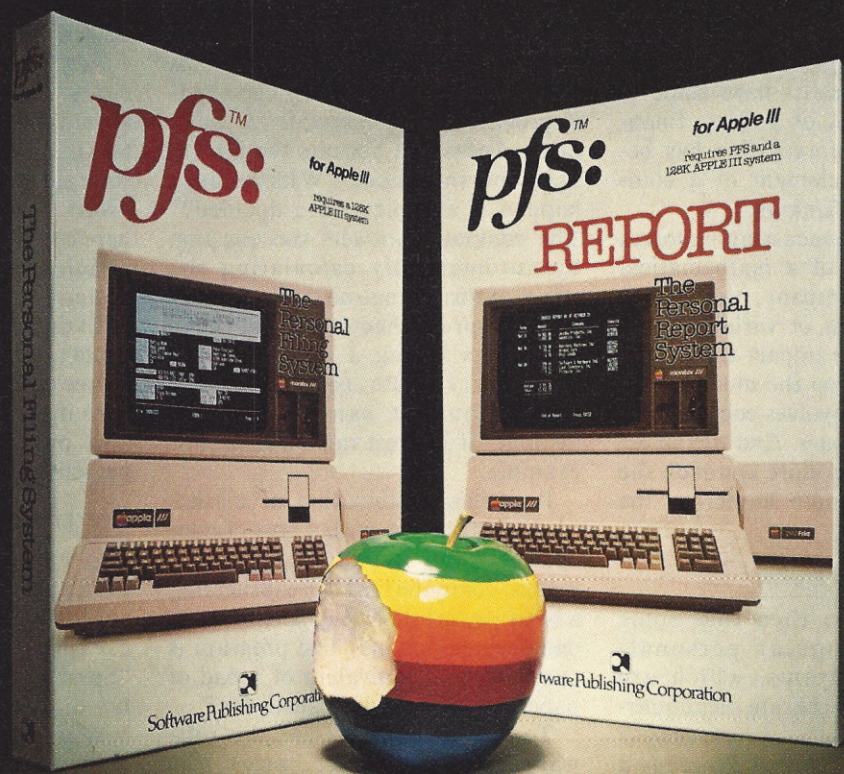
For a free, hands-on demonstration of PFS and PFS: REPORT, stop by your local computer store. If they don't have it yet, tell them to call Software Publishing Corporation at (415) 962-8910. Or write 1901 Landings Dr., Mountain View, CA 94043.

You'll be amazed at how much you can bite off.

Hardworking software for Apples that isn't a lot of work.

pfs: Software Series

*Apple is a registered trademark of Apple Computer, Inc. **PFS is a trademark of Software Publishing Corporation.



Scenarios For Success: The Vision Of Spreadsheets

With more timely and complete "what-if" information, better judgements are being made in corporate financial planning

by Myron Berger

What if you had married your first girlfriend instead of your last? What if you had pursued your interest in music rather than going into sales? What if you had a son instead of a daughter? Questions like these tantalize and tease most of us at least partly because the answers are beyond our grasp.

But in the business world, "what-if" questions are much more than fancy. The way they are handled may determine whether a company will survive and what kind of profits it will show. Thus, over the years, as businesses have grown and minute percentages of profits have come to represent millions of dollars, financial planning or forecasting has become a critical element of a company's strategic thinking.

Commonly, forecasting involves the construction of a mathematical model of the company, the identification of options or variables, and an analysis of the impact these variables could have on the model. Such an undertaking involves considerable time and work-hours. And the larger the company, the more complex the model and the more numerous the options.

Taking them by storm

It is no surprise then that some of the most popular personal-computing programs, which are sweeping into corporate headquar-

ters and small businesses alike, are those that are devoted to business modeling or electronic spreadsheets.

There are an estimated six to 12 versions of this type of software, offered by various vendors, and these products include VisiCalc, T/Maker II, SuperCalc, CalcStar and MicroPlan.

Instant changes

Basically, all the programs offer a blank spreadsheet—a large sheet of paper divided into a forest of columns and lines—with user-defined categories, values and relationships, as well as a what-if function. The what-if provision is so essential for businesses because it permits the user to ask, for instance, "What would happen if an entry were doubled?" The computer answers the question by automatically calculating the effect of this change on every number on the spreadsheet that has been defined as having a relationship to the primary figure. In that way, the annual budget can be updated instantly if interest rates change, for example.

It is this combination of mathematical efficiency with a host of non-dedicated values and categories that makes computerized spreadsheets a most powerful piece of software. As one devotee puts it, "The program is the electronic equivalent of a pad of paper, a pencil and a calculator."

To be a bit more precise, this software also serves as the human who writes on the pad and presses the calculator's keys. Of course, the com-

puter operator must manually input most of the data and define the variables, but much of the total task is now automated.

Since business is, at its core, an exercise in numbers—units in inventory, units of time, income and expenses, etc.—the spreadsheet programs suit a virtually limitless number of applications for the business professional. The most obvious areas involve money: budgets, annual reports, fiscal projections, sales records, and a bottomless list of others.

For the small-business owner who deals in a service, for example, spreadsheet programs could be used to analyze the relationship between time spent on a job and the resulting profit. Using the what-if function here could conceivably result in more efficient organization and work patterns.

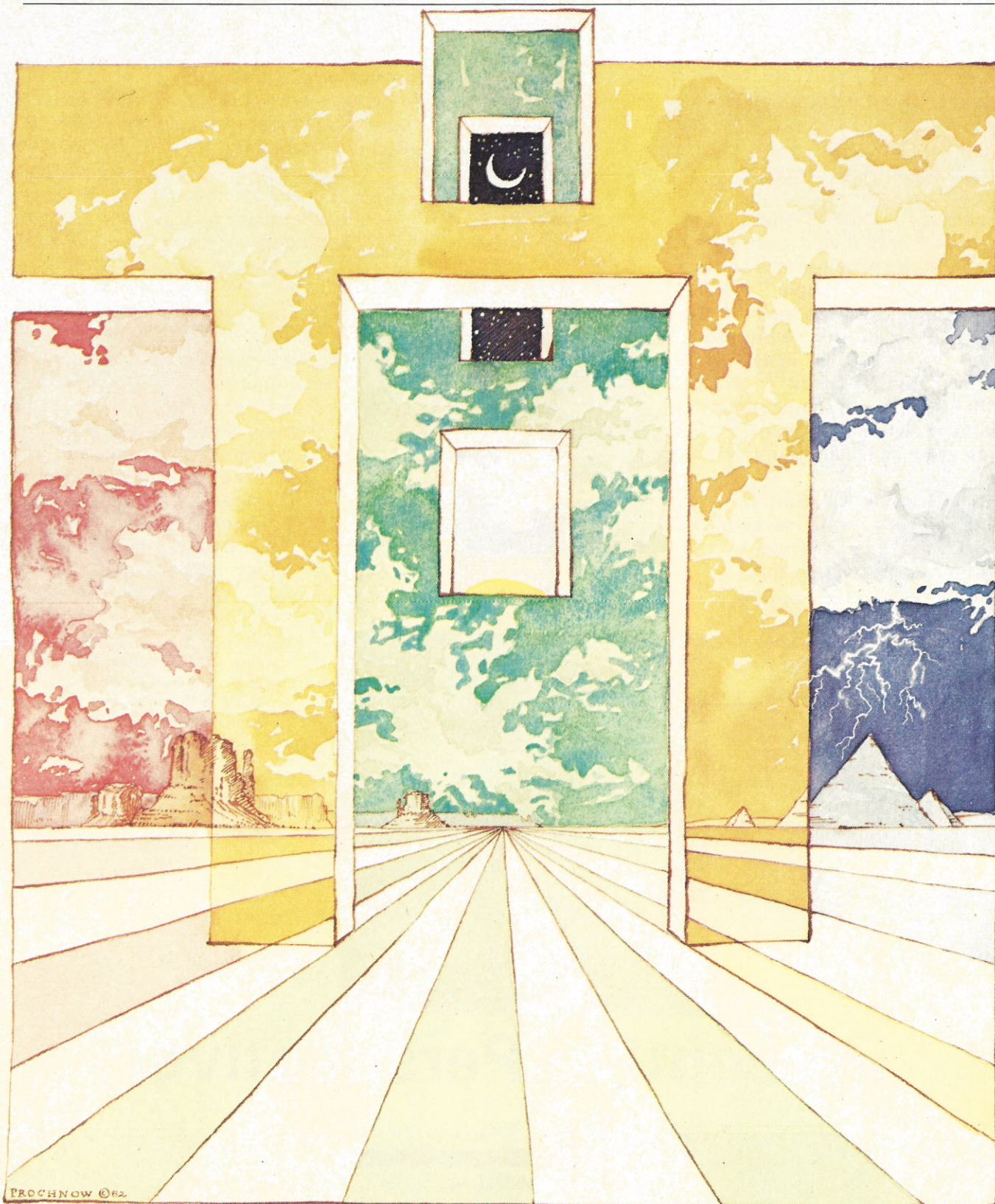
Even the home-computer user could apply electronic spreadsheets in reckoning a budget (What happens if water rates go up five percent and property taxes increase .45 percent?)

Everybody's doing it

The universal and creative nature of applications for electronic-spreadsheets programs has not escaped international attention. "Spreadsheet," a newsletter put out by a user organization called VisiGroup, reaches an international audience (in the United States, New Zealand, England, France, and Israel, among others) that includes

New York-based Myron Berger is a well-known consumer-electronics industry watcher.

*“Spreadsheets allow you to
play out your financial planning
on different stage sets.”*



Vistavision 80

Invisible or Invincible?

It all depends on your perspective.

The Vision 80[®] is a video display card that gives your Apple[™] terminal an industry-standard 80 column by 24 line display screen with a full 128 character set including upper and lower case letters with three dot descenders. It is compatible with all existing Apple[™] BASIC software and allows the use of 80 column lower case text with programs written in BASIC, FORTRAN Pascal, Microsoft CP/M[™] and ASSEMBLER. Full communications driver support allows the Apple II[™] to operate as an intelligent terminal

Definitely invincible. Ask Softalk magazine editors, who rated Vision 80[®] the Best Apple-video display card on the market.

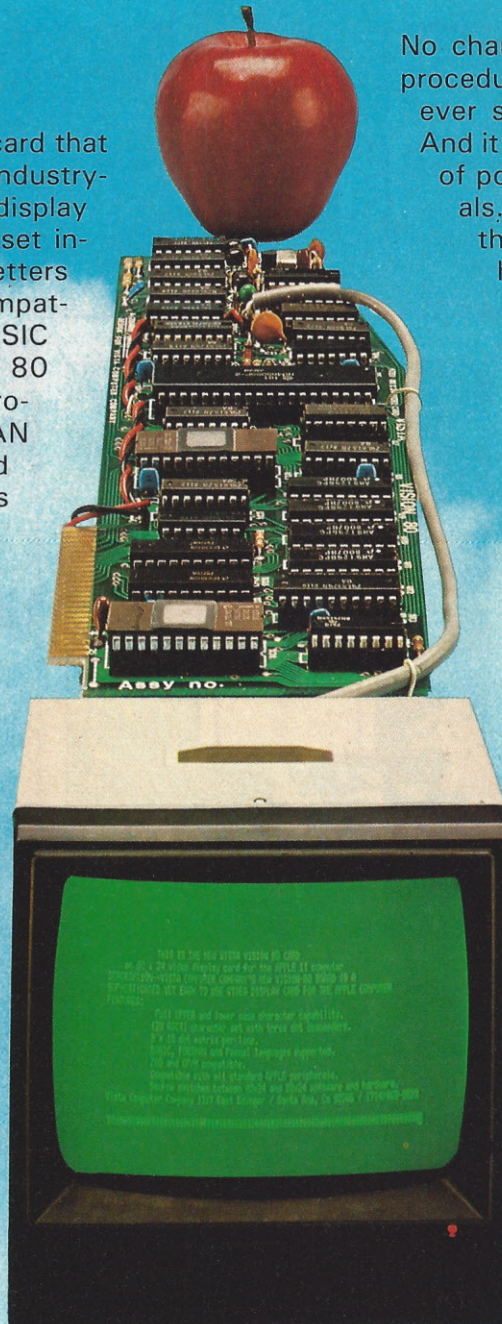
But the Vision 80[®] card has an "Apple" command vocabulary including H-tab, V-tab, HOME, TEXT, PR# GRAPHICS).

No changes in operating or programming procedures are necessary to produce whatever sophisticated displays you require. And it doesn't interfere with the operation of popular Apple[™] compatible peripherals. Except for the enhanced display, the enhanced display, it's as if you had never installed the Vision 80[®] in your Apple II[™] computer.

Definitely invisible.

Ask your local computer dealer for a demonstration of the invincible, invisible Vision 80[®] video display card by Vista Computer Company. Or correspond with us directly: Vista Computer Company, Inc. 1317 East Edinger, Santa Ana CA 92705, (714) 953-0523. Toll free order line: (800) 854-8017.

Be sure to inquire about our new Vision 40, a softscreen programmable character generator for Apple II[™] computers. It's great for graphics and perfect for foreign language applications.



Perceptive Perspective

Vista

COMPUTER COMPANY, INC.

1317 East Edinger • Santa Ana, CA 92705
714-953-0523 800-854-8017

"It taxes the mind to think of what the next generation of electronic record-keepers will be capable of providing."

accountants, farmers, Indian tribes, and a seed-distribution company.

The newsletter is filled with "VisiTips" and general information and advice on applications for VisiCalc—the most popular of the spreadsheeting software—and, to a lesser extent, other spreadsheet programs. Although the newsletter is very VisiCalc-oriented, Bob Korngold, its publisher, believes that some 15 percent of the group's membership uses another brand of spreadsheet program. (VisiGroup can be contacted at P.O. Box 254, Scarsdale, NY 10583; membership dues are \$25 per year and include the newsletter.)

Which medium for your message?

Most users describe spreadsheet-program applications in strictly financial terms. One notable exception is Daryl Scott, director of media research in the New York office of Foot, Cone and Belding, one of the largest advertising agencies in the country.

At Foote, Cone and Belding, as at other agencies of its kind, advertising is now a very scientific business—perhaps due in part to the ever-increasing use of computers in the business sector. Television shows, magazines, and other media are carefully studied and analyzed to determine the precise character of their audiences. An advertiser who has used market research to define his potential customers is able to selectively advertise in the media to which those customers are most likely to be exposed. This helps to assure that each advertising dollar spent will reap the highest possible return.

In this scramble for advertising paybacks, media-research departments have grown in importance at most agencies in recent years. Moreover, with the reams of statistics they require, these departments are a natural for computerization. And Scott finds that the electronic spreadsheet is the most convenient

program to use for quick and easy analysis of his department's data.

Quick tempo calculations

Not only has the program been able to plot out demographics on a clear, easy-to-read chart, but it also serves to analyze advertising expenditures according to specific market or medium. And having added a printer and software that can generate graphics, the research department can now quickly turn out attractively designed reports with charts and graphs that might otherwise have taken many work-hours to do. With the what-if capability of the spreadsheet program, a client can be handed new figures—or even a new graph—within minutes of requesting a look at costs under a different set of circumstances.

Since most of the spreadsheet programs are written with financial problems in mind, Scott says that his rather unorthodox application could become even more efficient if a program were written specifically for it. "The big problem," he says, "is that there aren't any packages for specific business applications."

But despite this shortcoming, Scott finds that his co-workers, most of whom have little or no experience with computers, are "playing" with the spreadsheet program and finding easy ways to fit their own style of work into the program's categories and formulas.

On the right track

Perhaps a more conventional application for this type of software has been set up in the planning department of CBS Records International in New York. The department is responsible for preparing a yearly strategic plan in which potential markets are examined, their sizes are estimated, and financial projections are compared with market size.

The CBS division comprises 26 overseas subsidiaries. In the past, the planning and budget departments,

using pencil, paper and calculator, only had time to draw up reports containing two to three scenarios for major subsidiaries. With the electronic worksheet, says Dick Simmel, the department's director, scenarios can be played out for each and every subsidiary.

Simmel adds that if top management wanted a figure to be changed in the "old days," it would have taken up to two or three days to carry that figure through the entire sheet; now, it takes less than a day. The upshot, Simmel says, is that "management can make probably the best-informed judgments about budgets that they've ever been able to make, simply because they have many more scenarios, and can look at the various options open to them."

Although the computer and electronic spreadsheeting have brought the CBS planning department into the modern age of business, as its manager, Simmel is unsure about the benefits of the new versatility. "The computer does so many things," Simmel says, "that my staff wants to load the world onto it. They're trying to do a little too much."

Extra efficiency

While many find that electronic-spreadsheet programs encourage greater generation of useful data, Stan Broome, manager of operational reporting and development for the New York-based firm Interway (a division of Trans-America) says increased efficiency is the primary benefit. Broome's chief responsibility is turning out the company's annual report and monthly projections of quarterly earnings.

Last year, before acquiring the program, it took three workers two weeks to consolidate all the data for the report. This year, with little practice in using the program (it was purchased at almost the last minute), two people were able to complete the same amount of work in less than three days. Under optimum condi-

PROFESSIONAL/MANAGERIAL

AVAILABLE SPREADSHEET PROGRAMS

COMPANY	NAME/PRICE	CONFIGURATION/CAPACITY
Addison Wesley Publishing (617) 944-3700 CIRCLE 200	MICRO DSS/Finance \$1500	Apple II, 48k and Pascal.
Comshare Target Software (formerly AMSI) (404) 634-9535 CIRCLE 201	Planner Calc \$195	CP/M based, runs with Apple DOS and MS DOS.
	Target Planner \$195	CP/M based, 48k minimum.
Context Management Systems (213) 378-8277 CIRCLE 202	M.B.A. \$695	IBM and Apple III; package contains electronic spreadsheet, data-base management, word processing, communications, graphics.
Cromemco (415) 964-7400 CIRCLE 203	PlanMaster \$295	Cromemco systems only.
Hayden Publishing (201) 843-0550 CIRCLE 204	FINPLAN tape \$69.96 disk \$74.95	TRS-80 Models only.
Intelligent Systems (404) 449-5961 CIRCLE 206	COLOR CALC \$200	Intelligent Systems 3650 in extended BASIC only.
Lifeboat Associates (212) 860-0300 CIRCLE 207	FPL \$745	Runs on CP/M 80 or MPM; 2 versions, 48k and 56k; one disk drive with 125k or two drives with 175k each; must have clear screen and cursor addressing.
	T/Maker 2 \$275	Runs on CRT with clear screen and cursor addressing, or on CDOS; 48k minimum.
MicroPro International (415) 457-8990 CIRCLE 208	CALCSTAR \$295	Runs on CP/M version 2.0 or above with 80-column screen, addressable cursor and 48k minimum; 56k recommended.
Ohio Scientific (216) 562-5177 CIRCLE 210	PLANNER PLUS \$149	Operates on hard disk C3B 74 megabyte, C3C 23 megabyte, and C3D 7 megabyte only.
Osborne McGraw-Hill (415) 548-2805 CIRCLE 211	MICROFINISS \$495	Runs on Apple II; is a UCSD program; has target search and sensitivity analysis.
Peachtree Software (800) 835-2246 ext 35 CIRCLE 212	MAGICALC \$300	CP/M based; 44k minimum.
Radio Shack (817) 390-3272 CIRCLE 213	SPECTACULATOR \$39.95	Runs on Color Computer.
Software Products (714) 268-4346 CIRCLE 214	LOGICALC \$290	Runs on Z80 machines or those that support UCSD Pascal, 56k.
Sorcim (408) 727-7634 CIRCLE 215	SUPERCALC \$295	Runs on CP/M-based machines.
Structured Systems Group (415) 547-1567 CIRCLE 216	MAGIC WORKSHEET \$250	8080 and Z80 based; runs on terminals that support 48k minimum.
Vector Graphic (800) 322-3577 CIRCLE 217	EXECUPLAN \$150	Vector Graphic systems only.
Visicorp (formerly Personal Software) (408) 745-7841 CIRCLE 219	DESKTOP PLAN II \$250	Runs on Apple II and III.
	DESKTOP PLAN III \$250	48k minimum; Apple II and III, IBM Personal Computer, Atari, Commodore PET, TRS-80 Models I, II and III, and HP 125.
	VISICALC \$250	Apple II and III, IBM Personal Computer, Atari 8000, Commodore 8032, 32k PET, TRS-80 Models I, II and III, HP 85, HP 87, HP 125.
Westico (203) 853-6880 CIRCLE 220	MINIMODEL \$495	Runs on most CP/M-based machines with 48k minimum; two disk drives; also runs with CBASIC.

tions, Broome believes one person can accomplish the task in two days. This would represent a 1400 percent improvement in worker efficiency.

On the negative side, Broome found that he was unable to merge files using his program. He is learning to write BASIC to revise the program and so improve its utility. As part of the system's extension, Broome hopes that the company's regional offices will eventually be computerized; that a standard format for reporting results can be adopted; and that the outlying offices submit their reports in format and on disk. This would virtually eliminate two of the most time-consuming tasks in using an electronic worksheet: constructing a format and entering data.

Broome also plans to use the program for the monthly reports his department does on interest costs. It now takes one worker one day to do this job. After Broome integrates this report into his computer, he hopes it will take only five to 10 minutes of the workday. The real benefit of this increase in efficiency, Broome says, is that "it gives you more time for review and analysis of reports; more time to do things you should be doing but didn't have time for before."

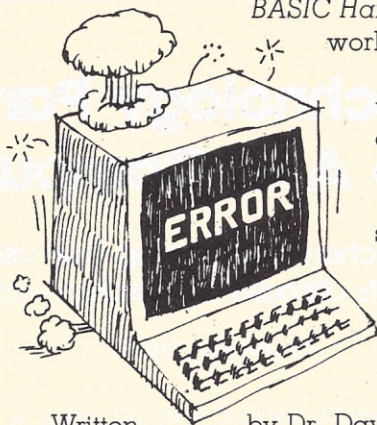
Meeting problems head-on

Peter Eversole, general manager and part owner of Eversole Motors, a car dealership in LaCrosse, Wis., has realized a new level of efficiency in tracking profits and problems with spreadsheet programs. Eversole, who is something of a computer buff (The company has a mainframe, an IBM Personal Computer, and a mini-computer which Eversole built from a kit.), keeps a daily electronic spreadsheet for each of the company's four departments. He estimates it takes 45 minutes per day to input the data.

"I think using the computer has definitely decreased our reaction time to problems," says Eversole. "The auto business is very volatile, and being able to sense a change in

When your computer won't speak your language, you need a basic handbook.

As a matter of fact, everyone who works in BASIC needs *The BASIC Handbook*. It is the definitive reference work on the subject of BASIC.



The BASIC Handbook is an easy-to-use encyclopedia of nearly 500 words covering the "dialects" used by virtually every BASIC-speaking computer in the world. But more than that, it's a simple, step-by-step guide to translating programs from one computer to another. So now you can actually use software printed in magazines and elsewhere, no matter what computer you own.

Written by Dr. David A. Lien, author of the *Tandy TRS-80 Level I User's Manual* and the *Learner's Manuals* for the Epson MX printers, this completely revised Second Edition contains almost twice as many entries as the best selling First Edition, making it by far the most up-to-date BASIC reference book you can buy.

Extensively indexed and cross-referenced, *The BASIC Handbook* gives you 480 pages packed with the information you need to be a better programmer. And if, after 30 days you don't agree it's indispensable, send it back. We'll return your money.

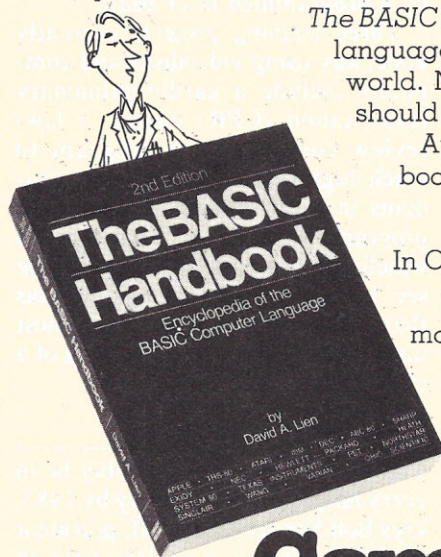
The BASIC Handbook is available in several languages and accepted throughout the world. No one who programs in BASIC should be without it.

Available at better computer and book stores,
or call (800) 854-6505

In California (714) 588-0996

To order by mail, send check or money order for \$19.95 (California residents add 6%), plus \$1.65 shipping and handling.

Overseas orders send \$19.95 plus \$2.38 surface shipping and handling.



CompuSoft® Publishing

1050-E Pioneer Way, El Cajon, California 92020

direction means that we can attack any problem immediately. Without that kind of input, we clearly risk economic loss."

Eversole has formatted the program so that—in addition to providing day-to-day information on the state of the company—daily entries are automatically totaled for monthly reports. Since it only takes 45 minutes to input the daily data, he frequently does it himself during lunch—giving the company information about its performance that is only hours old.

A faster option

At a somewhat larger company, Merrill Lynch Pierce Fenner & Smith, personal-computing support team manager Jack Halbert says that speed is also a factor in his company's use of electronic-spreadsheet programs. For monthly budgets and other reports that need periodic updating, Halbert points out that once the format has been constructed, the user need only input a "stream of numbers," and the total task can be speeded up by more than 100 percent.

Halbert and his colleagues in the New York office are also using the electronic spreadsheet to do calculation for options strategies and bond swaps, while office managers are using it for budgets, revenues, sales forecasting and analyses. The what-if function is used to compare stocks and options and bonds for swapping.

"The use of electronic-spreadsheet programs is in its infancy—just like personal computers," Halbert says. "But, technically speaking, it's one of the best pieces of software I've ever seen."

Considering Halbert's assessment, it takes the imagination to try to conceive what the fourth or fifth generations of these electronic record-keepers, preparers and analyzers will be capable of providing for information-hungry businesses. 

New Technology Partners: Video And Computers

Technology watchers are keeping their vision tuned to video—and its ultimate connection—computers

by Jordan Gold

Editor's note: While combining video technology and computers is a relatively new concept—and planned uses such as sales training, manufacturing models and advanced video games are still developing—an infant industry is growing up around the early breakthroughs. Personal Computing plans to cover all the advances in video/computer technology as they happen.

At this point it is taking a page from the future, but the day is not far away when the video game aficionado will be able to sit down in front of his monitor and watch "real live" warriors battle on the screen. One man in a space ship will fire at the enemy, score a hit and "real" blood will be spilled. Visual illusions such as these will become more and more possible as the technologies that are wedding computers and video are widening in scope.

And to those working in this area, the prospects are as exciting as the wedding was inevitable. "You're talking about something special," says John McPherson, national video marketing manager for Sony Corp., "and something that had to occur. It is the synergistic marriage of visual capacity and the intelligence of the computer."

Much of this early interaction between computers and video is on videodisks, rather than tapes. This is

generally because it is still easier to program a computer to find and analyze a specific portion of a disk than it is to send it searching through reams of tape. That video war using real actors, for instance, will probably be accomplished on videodisks, and before that, animated games on disks are expected.

Currently, videodisks come in three types: capacitance electronic, video high density and laser optical. Of these three, laser opticals are best used with computers, because the disks are grooveless and can be read by a programmed laser beam.

Three training projects currently underway using videodisks and computers include a cardio-pulmonary resuscitation (CPR) course, a law-review course, and a program to teach high-school economics to students in rural schools. The way the programs work is the user controls which part of a particular program he sees by answering or asking questions that prompt the computer to almost instantly access a certain portion of a videodisk.

Going cross-country

The CPR course will probably be in every hospital in the country by 1983, says Bob Sander-Cederloff, president of SC Software, a Dallas firm in charge of software for the project. To teach the course, instructors use a 48k Apple II with a disk drive, a specially designed cassette player, a Sony LDP 1000 Laser-videodisk player with built-in microprocessor, a Sony Trinitron television, a Video

1000 monitor, a light pen and a specially designed manikin complete with a variety of sensors.

The videodisk contains 30 minutes of material, and other course aids include slides and audio-visual material. There is an additional one hour and 30 minutes of material on the audio tape. The entire course takes about three hours.

The user interacts with the system by performing CPR on the manikin or by answering questions. The computer offers feedback through voice, graphs and slides.

To input information, a light pen is used instead of a keyboard. "In the final system, the keyboard won't even be visible," Sander-Cederloff says. "All that you'll see on the computer is the on/off button." The light pen is operated by touching it to the monitor at the desired spot to indicate a correct answer or desired program location.

The specially designed manikin is equipped with sensors that allow all actions performed on it to be monitored and graded by the computer. The student talks to the manikin, gives it mouth-to-mouth resuscitation, takes its pulse and pushes on its chest during the performance evaluation portion of the course. The computer then gives the student immediate feedback by showing him graphs of performance, such as force used in pushing on the chest, and by accessing parts of the disk to talk to the student. If the student doesn't push hard enough, for example, a doctor comes up on the screen

Jordan Gold is a Dallas-based writer whose work frequently appears in consumer electronics publications.

*"A computer lesson
is much more effective
with video
to compliment it."*

and politely tells him to try again.

The purpose of the program is two-fold, Sander-Cederloff says. "First, there are more people wanting to take CPR courses than people available to teach them. There just aren't enough good teachers around in this area. But this course will be available seven days a week, 365 days a year in every hospital in the country. The course also allows the American Heart Association to control the quality of the instruction because everyone will be taught the same subject matter,"

The system presently costs about \$10,000, but Sander-Cederloff says that with advances in videodisk technology the price will decrease. "The biggest cost savings will occur," he says, "when semiconductor-based lasers are perfected."

Par for the course

In the area of education, a program that helps teach a high-school economics course using videodisks and computers is being developed by the Minnesota Educational Computing Consortium (MECC), a group dedicated to the promotion of computer use in educational environments. The course is taught on a 48k Apple II with a disk drive, a Pioneer Laserdisc videodisk player, an interface between the computer and the Pioneer, and two monitors, one for the computer and one for the videodisk player.

The course will be presented in five units over a semester, and each unit will consist of 12 20-minute sessions. One unit, an introduction to economics, has been completed, but Project Director Kent Kehrberg hopes to get the entire course completed by 1984.

"Concepts are presented to the student, and films (on videodisk) and slides (on computer or videodisk) are shown to illustrate the concept," says Kehrberg. The course also has a built-in help option to assist a student with concepts he doesn't understand.

(continued on page 70)

THE VINDICATION OF VIDEO

Those who have scorned the old picture tube as nothing more than a means to evening anesthesia will be happy to know that video technology is extending far beyond opiate uses.

The video and computer industries are merging on many fronts, bringing video out of the sole realm of home entertainment and into such diverse video/computer applications as the following:

- Pilot training that offers relatively accurate flight simulation. A miniaturized version of an airplane's cockpit, as well as certain environmental conditions that a pilot is likely to encounter, are visualized on the video monitor. The computer takes the pilot trainee through a variety of flying paces by varying the video image.

- Diagnosing machine malfunctions. From the videodisk the computer accesses a clear, true-to-life "schematic" of the internal structure of a machine that needs repair—in this case showing pictures of real components, not simply drawings of them. The computer can then direct the videodisk to focus in more minute detail on a specific section of the machine's interior.

- Point of sale displays. A good example of this is being used by General Motors at its Oldsmobile dealerships. Customers in the GM showrooms "tell" the computer what features their dream car would have. The computer digests this information, passes it on to its video partner, and the dream automobile appears on the monitor, replete with the necessary extras. Of course, it's an Oldsmobile.

- Corporate management training. By answering a series of questions asked by the computer, and watching dramatized situations that appear on the monitor, managers are taught techniques to deal with personnel problems, office inefficiency, and the like.

Two companies that have led the development of the necessary technology for these applications are Sony and DiscoVision Associates. Pioneer Electronics, though, is now expected to

make a strong showing in the industrial and commercial markets as it prepares to take over the manufacturing operations at DiscoVision, a deal that was completed in February. All involved firms predict explosive growth over the next few years.

"We're projecting that sales of videodisk/computer systems in 1982 will increase 250 percent over the 1981 level," says Miller Bonner, former manager of communications at DiscoVision, which was previously owned jointly by IBM and MCA. "The technology is ahead of the creative process in this area, so the only limiting factor is how quickly the creativity leaps from the people developing products for the market."

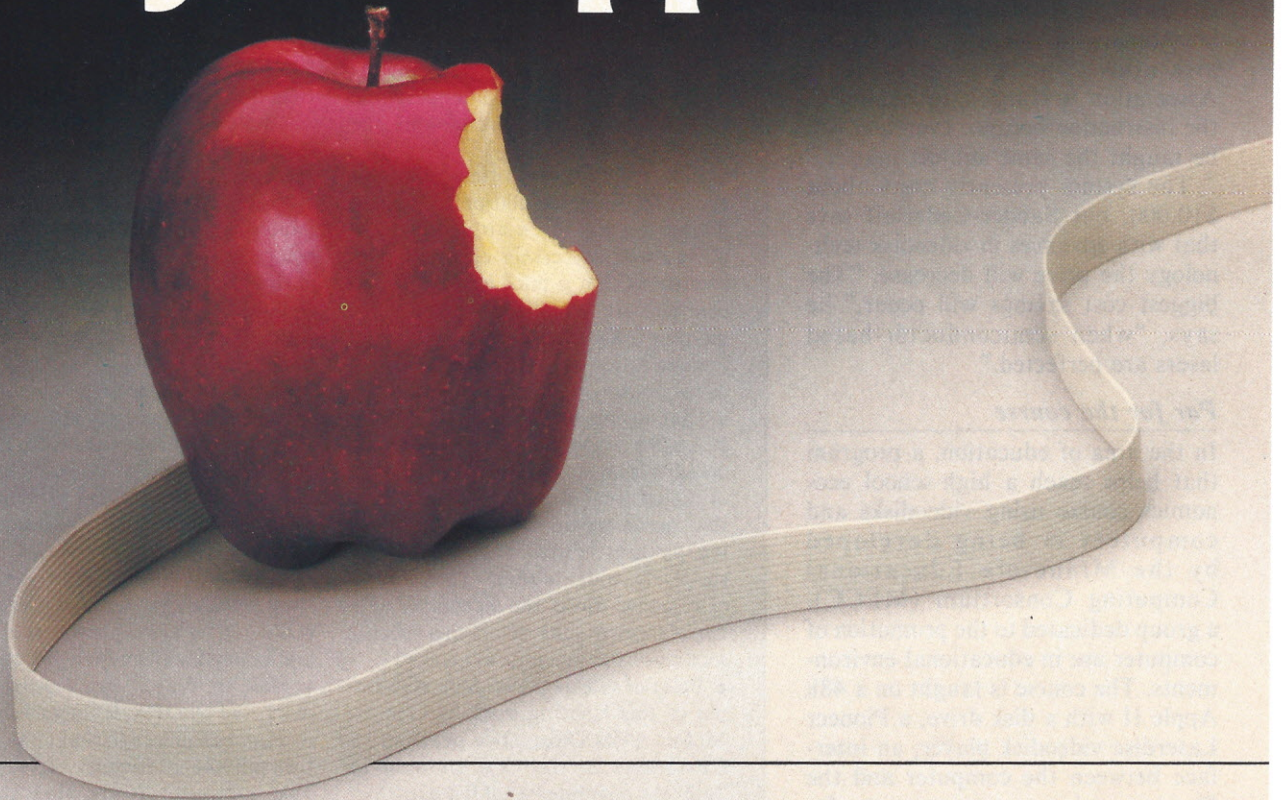
In the consumer area, which is conceded by most industry observers to be a far less developed market than the industrial field, two available disks give an indication of the direction this sector of video/computer interaction is taking.

- The First National Kidisc, available from Optical Programming Associates (OPA) in N.Y. is a potpourri of games and educational snippets for children.
- How to Watch Pro Football, also marketed by OPA, features seven professional coaches who take the viewer through the rudiments of the game. The computer is the link through which the viewer speaks to the coaches on the monitor.

Observers of these video/computer interactive systems describe it as an extremely special technology. They say that an individual using a system, in very little time, becomes attentive solely to the monitor, and the computer seems to disappear; in effect, a relationship is formed between the viewer and the person who appears on the monitor.

The future promises even greater breakthroughs in the growing video/computer connection beyond the current simple computer access to visual data stored on videodisks. *Personal Computing* will report on these breakthroughs as they occur.

The disk drive that puts more byte into your Apple.



Introducing the first totally compatible Floppy Disk Drive.

Rana Systems has designed a totally compatible disk drive for Apple, that's better than Apple's. A high density, high capacity disk drive and controller that offers a myriad of features Apple never thought of. Unique advantages that get the maximum efficiency out of your existing Apple II® hardware and software.

At Rana, we knew you wanted more storage, so we went right to the core of the problem. Even our most economical model is designed to give you 15% more storage capacity than Apple's. Our top-of-the-line unit gives

you 4 times the capacity of Apple's comparable unit. Even our design is far more dramatic than theirs. With lines that actually complement the sleek Apple II computer.

We're a step ahead of Apple because we have a faster step.

Holding more information is even more valuable when you can get it faster. The Rana System track positioning mechanism is engineered to access three to four times faster track to track, with greater accuracy than Apple's. Our disk drive offers safeguards like a stall provision to protect spin motor burnout,



an advanced write protect feature that keeps your information where you put it, and an energy saving device that "powers down" when your disk drive is taking a break.

We even took a bite out of Apple's price.

Our most popular model is 25% more economical per byte than Apple's, providing you with maximum performance, superior cost efficiency, and totally compatible styling. It also comes with a free diskette containing all the optional software and supports you'll need to enhance the capacity and performance. And it's all backed up with an efficient service

support system, and a full 90 day warranty.

The Rana System Floppy Disk Drive. Just plug it into your Apple and all those delicious extra bytes will be yours.

RanaSystems™



20620 South Leapwood Avenue, Carson, CA 90746 213-538-2353.
For dealer information call toll free: 1-800-421-2207.
In California only call: 1-800-262-1221. Source Number TCT-654.
See our booth at the West Coast Computer Faire Show.

Be a Part of Our Success



SDS MOVES AHEAD

We at SDS have built our reputation by offering the highest quality utility software available, combined with personalized service and after-sale technical support. Our total involvement in the utility software area is further reflected in our president Roger Wagner's widely read monthly column, "Assembly Lines". Our thorough knowledge of the field, and our sense of commitment to all our customers have led to tremendous success in 1981.

So SDS is growing - from the creative vision of a single person, to one of the shining stars of the software industry. Whether you're an end user, dealer, or author, we want you to make SDS part of your success with the Apple II.

To make that happen, we're now offering a wider range of utility and other software, more customer service, better author benefits. The service is still personal and the products are still the finest anywhere - but now we can offer you more . . .

MORE NEW PROGRAMS

ROUTINE MACHINE - A terrific way to put machine language in your Applesoft programs. Simply choose from a pre-written library of subroutines. No knowledge of machine language is required.

AMPERSOFT PROGRAM LIBRARY - A set of additional machine language subroutines for use with Routine Machine.

MERLIN - A powerful, full-featured 6502 macro assembler.

ASCII EXPRESS: THE PROFESSIONAL

A professional version of our best selling communication package that transfers files of ANY size or type. Supports all 80 column boards, interactive macros, and much more.

P-TERM: THE PROFESSIONAL

A Pascal version of Bill Blue's highly acclaimed communication software.

DOUBLETIME PRINTER - Increase your Apple's productivity by simultaneously printing text or binary files from one program while you run other programs.

UNIVERSAL GRAPHICS - The ultimate Hi-Res printing utility to transform your creations into permanent records on ANY graphic printer. Includes picture cropping, inverse inking, horizontal or vertical printouts, and a range of magnifications.

MORE DEALER SUPPORT

SDS is committed to the continuing support of the Apple dealer. As part of our new program, SDS offers:

- Informative point-of-sale materials
- Comprehensive national advertising
- Head Start Program to insure priority delivery of all new products
- Special dealer discount on in-store display items
- Comprehensive line of wide application software products
- Full-time technical support staff

MORE AUTHOR BENEFITS

SDS is an industry pioneer in innovative software for the Apple II. When you join the SDS team, you get the benefits of a professional support staff experienced in providing all the help you need to market your program. Other benefits include:

- Technical programming assistance
- Unique copy protection with limited backups
- Successful marketing strategies
- Assistance in writing the manual
- Professional product artwork
- Quality advertising
- Superior packaging
- National distribution
- Highest royalties paid monthly
- Customer service support

Here's the chance for you to market your program with the finest publisher in the software industry. Let Southwestern Data Systems' reputation and proven track record go to work for you. Be a part of our success - call today.

SDS
southwestern
data systems™

P.O. Box 582PF Santee, CA 92071
Tel. 714-562-3670

**"When looking
at a screen,
attention spans increase
and motivation rises."**

VIDEO AND COMPUTERS

(continued from page 65)

"The student can't ask a direct question, but he can get help with his problem," Kehrberg states. Tests are also given before and after each unit.

Kehrberg says that the target of the course is rural schools and districts that would have only three or so students taking the course each semester; hence, the district could not afford to hire an additional faculty member. "This type of course will put small school districts on a par with larger ones," Kehrberg states. When the course is completed, Kehrberg plans to market it throughout the United States, and plans are also being developed for projects in the areas of foreign languages, physics and mathematics.

One of the main advantages of using the videodisk in conjunction with a computer for teaching, says Kehrberg, is that the quality of the video is excellent. "When using a computer to make pictures or do graphics," he says, "the images are rather crude. A computer lesson is much more effective with video to compliment it, and there is an increased attention span and motivational level when looking at a screen."

The studious barrister

Another course being planned in the education field is in the area of law reviews. Ben Zander, president of Zander Productions in Summit, N.J., and a consultant for law-related computer uses, is developing a program that will allow students to study for the multistate portion of their bar exam using a computer/videodisk combination.

The review is three to four hours long and consists of four videodisks full of lectures and review questions. Because of the amount of information offered, three floppy disk drives are necessary.

The system currently consists of a CP/M-compatible Apple II with the three disk drives, a Microsoft Z80

softcard, a Pioneer Laserdisc player, a Hitachi 19-inch color monitor, an NEC 13-inch monochrome monitor and an Adwar Video interface card.

Although this combination of videodisk and computer is extremely useful for education, programming the system can be a problem—one that Bob Sander-Cederloff says can only be dealt with by professional programmers. To offset some of the difficulty, Zander has developed a new computer language for videodisk/computer programs.

The language is called LOQUITOR for Law Oriented Query and Uniform Instructional Teaching or Review Language. "It's main advantage," Zander says, "is that it allows me to write the locations for laserdisk access in the same frame and chapter numbers to which the Pioneer corresponds."

"For example, I have a question with choices A, B, C and D. When I write the program, I put a GOTO command for each choice, which tells the computer where to go on the disk should the student desire additional review. I also include a GOTO V command, which tells the videodisk which frame and chapter number to access. If I had to write special codes for each location on the videodisk, the program would take a lot longer to write."

The ability to access the lectures after each question is very important, Zander says. "It's fantastic positive reinforcement for correct answers and instant review for incorrect ones."

Zander hopes to have the law-review course ready for use before the February 1983 bar exam.

The reason that all projects mentioned use two monitors instead of one is because of the difficulty in getting an interface to easily switch back and forth between computer and videodisk output. Theoretically, video cassette recorders (VCRs) could be used with computers much the same as videodisks, but access time is much

slower. However, since video recorders have recording ability, their usefulness as a data-storage medium is not being overlooked.

Converting data

VCRs are used to store information by converting the digital data a computer generates into a black-and-white signal, allowing large amounts of information to be stored in a small amount of space. One of the best uses for the VCR as an electronic information filing system is for archival storage—information that can't be updated. "Simply unplug the monitor from the video output jack on the computer and plug in the VCR," says Zander. "Set the VCR to record, and record one frame. It will record whatever was on the screen."

The VCR can record at three speeds. This means that a full tape runs two hours, four hours or six hours, depending on the machine's speed setting. At the two-hour speed, since the tape is moving at its fastest, it produces a high-quality recording. But for storage purposes, high quality isn't a major consideration, but storing as much information as possible is. "I can fit 70,000 pages of documents on each video tape at six-hour speed," Zander states.

Another use of video recorders is for backup storage, or filing information that is also on the computer memory system. "There are 90 megabytes of storage capacity on a video tape at four-hour speed, and 125 megabytes at six-hour speed," says Bob Courier, director of future systems for Alpha Micro, an Irvine, Calif.-based manufacturer of personal-computer systems that is heavily involved in using VCRs for backup purposes.

Courier also says that when the cost of a VCR and a computer interface are added together, the price of backing up information on video equipment compares favorably to conventional methods, such as hard disks.

OKIDATA

Making small printers for people who think big.

OKIGRAPH™ Dot Addressable Graphics Prints Circles Around The Competition

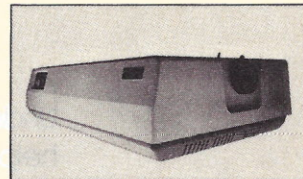
○ r squares. Or charts. Or graphs. Or illustrations. Or any graphic data your computer tells it to print. All with superb clarity and resolution.

OKIGRAPH™ is standard equipment on the Microline 84 and the Model 2350. It's an easily added option to the Microline 82A and 83A. So don't settle for the plain old text you get with other printers. Be creative. With Okigraph.

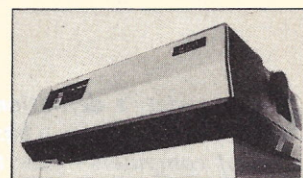
Interested? Contact us at 111 Gaither Drive, Mount Laurel, N.J. 08054, or call (800) 257-7768 for the name of your local authorized Okidata distributor.

Okidata is a subsidiary of
Oki Electric Industry Company Ltd.

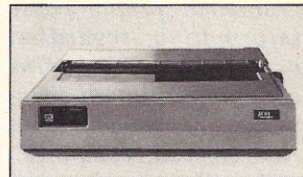
- OKIGRAPH™ I includes two plug-in PROMs and an instruction manual on Assembly language programming.
- OKIGRAPH™ II includes a floppy disk for additional graphics printing features and an instruction manual.



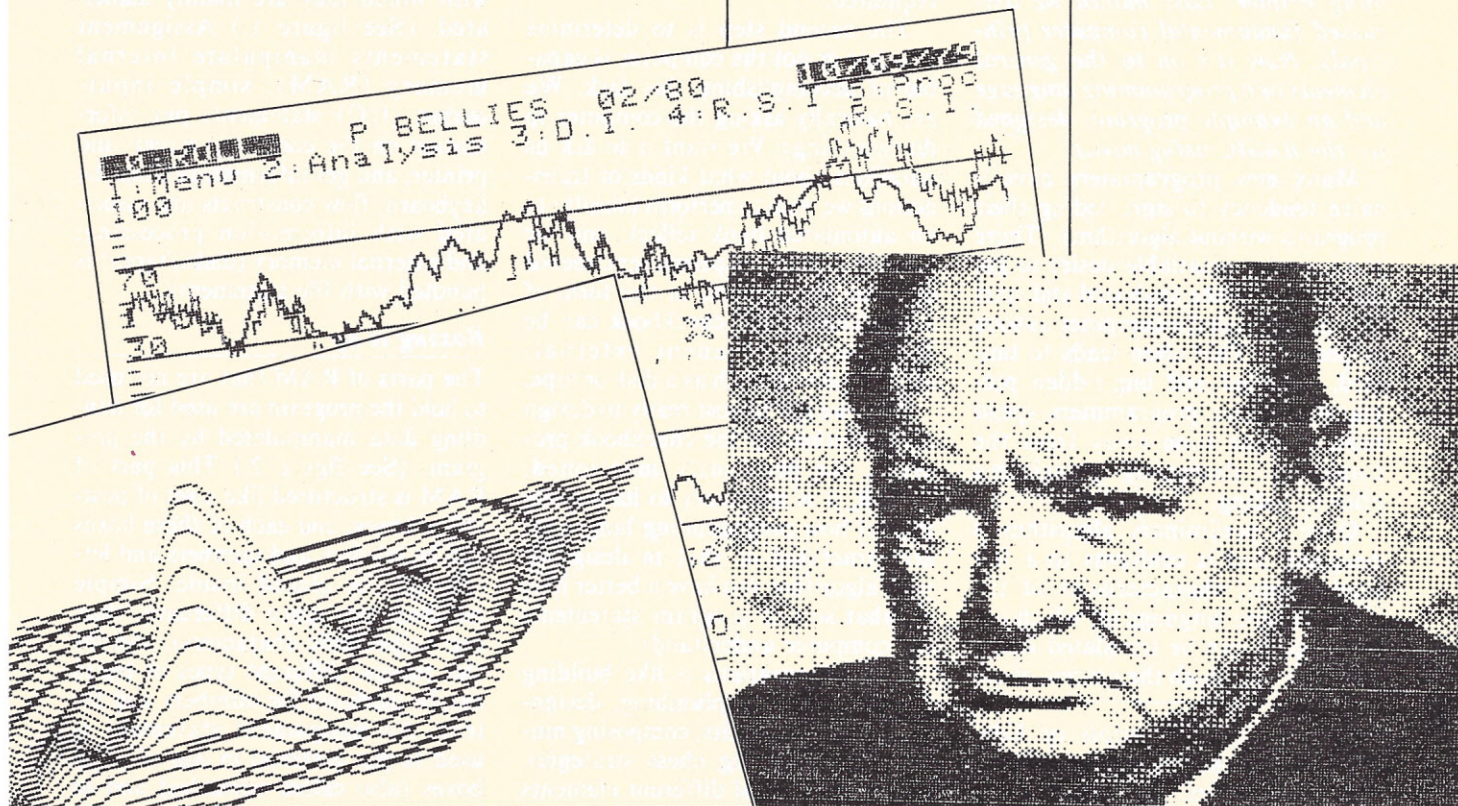
Microline 82A



Microline 83A



Microline 84



A Programming Primer— Part II

Understanding some basic programming principles can only help you achieve your goal of increased productivity and personal pleasure via your computer

by Leon Starr

Our society's definition of literacy now includes a basic knowledge of computers—how they work and, to a degree, how they are programmed. People possessing this information, regardless of their occupations, are finding that computer-related changes in the workplace pose no threat to job security. Instead, computer literacy is giving them an edge over employees who have lacked the foresight to plan ahead.

Hence, our three-part *Programming Primer*. Last month we discussed fundamental computer principals. Now it's on to the general elements of a programming language and an example program, designed for the BASIC-using novice.

Many new programmers have a naive tendency to start coding their programs without algorithms. There is a common insatiable desire to get your hands on the keyboard and start interacting with the computer as soon as possible. This often leads to tangled, confused and bug-ridden programs. Mature programmers spend most of their time away from the computer—designing algorithms prior to coding.

Once a preliminary algorithm is designed, and it conforms to a few fundamental characteristics of the programming language for which it is intended, it can be translated into a program. Although the process of en-

tering program code is very easy once you get used to it, there are a few strange, but simple concepts that must be understood.

What do you want done?

The first step involved in developing a program is needing a program. One example is a program that will keep track of a checkbook, or more specifically, a program that allows computer users to enter documents such as checks or deposits and provides a current balance whenever it is requested.

The second step is to determine whether or not the computer is capable of accomplishing this task. We are basically asking the computer to do two things: We want it to ask us questions about what kinds of transactions we wish to perform (similar to an automated bank teller), and we want it to keep a permanent record of these transactions in the form of a checkbook. The checkbook can be kept on a permanent external-memory device such as a disk or tape.

Now we are almost ready to design an algorithm for the checkbook program. As previously mentioned, though, it is necessary to have some idea of how programming languages are structured so that in designing your algorithm you have a better idea of what sort of program statements the computer understands.

Writing programs is like building houses, installing plumbing, designing electrical circuits, composing music and developing chess strategies. There are a lot of different elements

that must put together in some order to construct what is needed. In plumbing there are pipes, joints and connections. In music there are notes and scales. In chess, there is a finite set of valid moves that can be made. Programming languages are also made up of elements that can be combined in an infinite number of ways to create useful programs, and these elements are called statements, lines and constructs.

Program elements are categorized by the area of the computer hardware with which they are mainly associated. (See figure 1.) Assignment statements manipulate internal memory (RAM); simple input-output (I/O) statements put information on the computer screen and printer, and get information from the keyboard; flow constructs are associated with information processing; and external memory (disks/tapes) is handled with file statements.

Boxing it up

The parts of RAM that are not used to hold the program are used for handling data manipulated by the program. (See figure 2.) This part of RAM is structured like a set of post-office boxes, and each of these boxes can be labeled, and numbers and letters can be placed inside. Simple numbers use space differently than text (alphabetic characters), and for this reason, different types of boxes can be declared for numbers and for text. An assignment statement is used to put material in one of these boxes (also called variables) and to

Leon Starr is a principle of Educamp, a firm that trains people in the use of computers.

“Flow structures govern program execution the way joints and valves guide water through pipes.”

assign it a label. Here are a few examples of numeric assignments:

LET A = 37

LET B = 19

With these two statements, two variables are allocated and labeled A and B. The variables are then loaded with the values 37 and 19. In an assignment statement an “equals” sign does not signify equivalence as it does in high-school algebra; instead it is used as a sign that indicates the loading of the value on the right into the variable on the left. We can now refer to these numbers by their labels.

LET C = A + B

C now has the sum of 37 and 19, or 56. We never have to worry about the actual values inside the variables we are manipulating. This makes it possible to set up general-purpose formulas that can be used for many numbers. In fact, the computer can be programmed to count in this way:

LET A = A + 1

Here, A is increased by one, making a total of 38.

Different BASICs have different rules for labels, but all of them have the letters A–Z as valid labels. These letters are also valid labels for text, if they are followed by a dollar sign. For example:

LET A\$ = “Laurie Levin”

LET B\$ = “Tuesday”

Printing it out

We can now use the labels whenever we want to refer to the text. A statement such as PRINT B\$ will put “Tuesday,” the string of characters from ‘T’ to ‘y,’ on the screen. On the other hand, the statement: PRINT “B\$” would put the actual string “B\$” on the screen. This is because it is enclosed in quotation marks, which are used when it is necessary to print a literal string of characters. When there are no quotation marks, it is assumed that you are using a label and referring to the information it

represents. The PRINT statement is used to print labels as well as literal information. For example:

PRINT “Hello there”

prints: Hello there

PRINT A\$ prints: Laurie Levin

PRINT “A\$” prints: A\$

Properly named, the BASIC input statement is INPUT, which makes the program wait for the user to type in some information. When the user types in that information, the INPUT statement puts it in a memory box with a specified label. For example, INPUT N\$ makes the program wait for the user to type in a string of characters and hit the RETURN or ENTER key. Then N\$ becomes the label for whatever was typed in. If you want to ask someone for his name, you put the following two statements in your program:

PRINT “What is your name?”

INPUT N\$

Later you might want to address the person by his name:

ELEMENTARY PROGRAM STATEMENTS

KEYBOARD

INPUT

SCREEN

PRINT

COMPUTER

RAM
CPU
ROM

DISK DRIVE FLOPPY DISK

OPEN, CLOSE
PRINT #
INPUT #

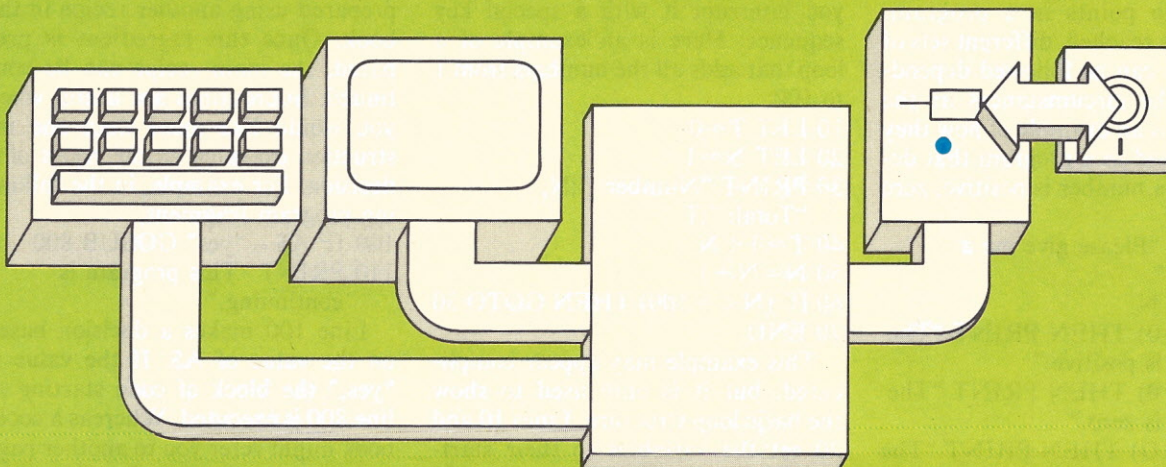


FIGURE 1

diagrams by William F. Goodenough

ADVANCED

PRINT "Good morning, ";n\$

If the person's name is Ted, for example, the computer prints:

Good morning, Ted

The semicolon is used in the PRINT statement merely to glue the literal string to the label. It allows print statements to print more than one phrase on a line at a time.

The order of execution

Numbers are used to tie a BASIC program together, and each statement must be labeled with a number. Upon execution, the statement with the lowest number is executed first; the highest is executed last. It is advantageous to number the successive lines of a program by tens, making it easy to insert new lines after a program is finished. For instance, a statement numbered 35 could be inserted between lines 30 and 40. Numbering by 100's and 1000's is also useful.

In most programming problems, however, it is necessary to alter the sequential execution of a program with flow structures. Flow structures govern program execution the way joints and valves guide water through pipes. The three types of flow structures are branches, loops and subroutines. (See figure 3.)

Branches, implemented with the IF-THEN statement in BASIC, create decision points in a program. When one is reached, different sets of instructions can be followed depending upon the circumstances at the time. Here is an example of how they would be used in a program that determines if a number is positive, zero or negative:

```
10 PRINT "Please give me a
   number."
20 INPUT N
30 IF (N>0) THEN PRINT "The
   number is positive."
40 IF (N=0) THEN PRINT "The
   number is zero."
50 IF (N<0) THEN PRINT "The
   number is negative."
60 END
```

RAM (INTERNAL MEMORY) STRUCTURE

PROGRAM	DATA
10 PRINT "BEGINNING"	NUMBERS
20 PRINT "HELLO"	A 37
57 LET Q=5	B 19
99 END	C 56
	TEXT
	A\$ LAURIE LEVIN
	B\$ TUESDAY

FIGURE 2

If the conditions in parenthesis are met, the statement on the right of the THEN is executed; otherwise, the statement is skipped.

Loops make it possible for a group of statements to be repeatedly executed a specified number of times, or until a given condition is met. The former is called a counting loop and the latter, a conditional loop. If a programmer is not careful, infinite conditional loops are created in which the given condition can never be met.

On to infinity

If executed, the computer repeats the same instructions forever, or until you interrupt it with a special key sequence. Here is an example of a loop that adds all the numbers from 1 to 100:

```
10 LET T=0
20 LET N=1
30 PRINT "Number: ";N;
   "Total: ";T
40 T=T+N
50 N=N+1
60 IF (N<=100) THEN GOTO 30
70 END
```

This example may appear complicated, but it is only used to show the basic loop structure. Lines 10 and 20 set the variables to their starting values. N counts from 1 to 100 while T totals these numbers. Line 60

is the bottom of the loop, and the condition in parentheses tests to see if N is still less than 100. Loops often incorporate the IF-THEN statement and the GOTO statement, which, in this example, sends control back to line 30 only if the condition on the left of the THEN is met.

A single statement can also call an entire block of statements, called a subroutine, into execution. Once the instructions in this block have been followed, control is returned to the statement just below the one that called the subroutine. Cookbooks also work this way. Many times a recipe calls for an ingredient which must be prepared using another recipe in the book. Once this ingredient is prepared, the main recipe can be continued. Subroutines are useful when you would like more than one instruction executed as the result of a decision. For example, in the following program fragment,

```
100 IF A$ = "yes" GOSUB 800
110 PRINT "This program is
   continuing."
```

Line 100 makes a decision based on the value of A\$. If the value is "yes," the block of code starting at line 800 is executed. Whereas a cookbook might refer you to another page number, a program makes references to line numbers. When the sub-

“There is a common insatiable desire to start programming too soon—leading to tangles, confusion and bugs.”

routine is finished, control returns to line 110. If the value is something other than “yes,” the subroutine won’t be called and control goes to the next statement, line 110.

Finally, there are statements that deal with external devices such as disk and tape drives. A program treats disks and tapes like file cabinets. Whenever it has information to put in the file cabinet, it must open up a named file folder, put the information in, and close the file. In most languages there are statements for opening, closing and creating files, but in BASIC, the OPEN statement is used for both file opening and creation. A version of the PRINT and INPUT statements are used with files so that it is possible to input information and take it out. Here is an example:

```
10 PRINT "Give me your name and
  I will save it on"
20 PRINT "the magnetic floppy
  disk."
30 INPUT N$
40 OPEN "Names" FOR OUTPUT
  AS FILE 1
50 PRINT #1, N$
60 CLOSE 1
70 END
```

Line 30 gets a name from the user

and places it in N\$. In line 40 the file “Names” is opened and the number 1 is declared as a label for this file. The PRINT statement in line 50 prints the value of N\$ in file 1 (the “Names” file), line 60 is responsible for closing the file, and line 70 ends the program.

State your purpose

Files must be opened with a stated purpose such as OUTPUT, INPUT or APPEND. This tells the processor whether the file should be created and written on, read from its beginning, or written onto its end.

Now that we know the fundamental structures available in BASIC, it is possible to write an algorithm for the checkbook program. Algorithms are created by systematically breaking a problem down into useful pieces, and each step should be detailed enough so it can be translated into programming code without a tremendous amount of difficulty. The final draft of the checkbook algorithm is:

- Find out what the user wants to do
- Add a document to the checkbook
- Get document information from the user
- Put information in the checkbook

- Now balance the checkbook
- Read each check amount in checkbook and add them together
- Print out the balance
- See if the user wants to do another transaction. If so, return to A, otherwise end.

This algorithm can now be translated into a BASIC program. To begin, we want the program to find out what the user wishes to do. To do this, we can ask the user a simple multiple-choice question and get his response:

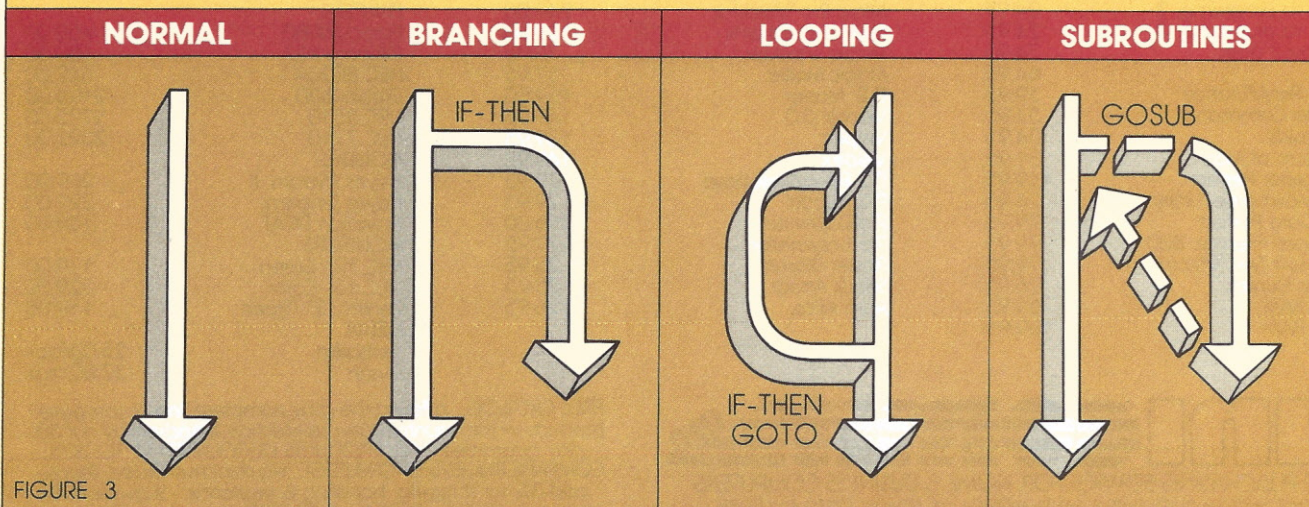
```
10 PRINT "Which transaction do
  you want to do?"
20 PRINT "(1) Add a check or
  deposit to your checkbook"
30 PRINT "(2) Balance your
  checkbook"
40 PRINT
50 PRINT
60 INPUT C
```

Chain of command

In this program, lines 10–50 print the question and line 60 gets the answer, which will be a choice of 1 or 2. Lines 40 and 50 just print blank lines so the display will be more readable.

As the algorithm indicates, the checkbook program has three basic functions. But there must be some

PROGRAM EXECUTION FLOW STRUCTURES



ADVANCED

way to find out what the user wants to do and channel the commands to the appropriate block of code responsible for that function. This can be done with the subroutines:

```

70 IF (C=1) THEN GOSUB 1000
80 IF (C=2) THEN GOSUB 2000
90 IF ( (C>2) or (C<1) ) THEN
  GOTO 10

```

Sorry, wrong number

Lines 70 and 80 of the subroutines check to see which choice (C) was made. In line 70, GOSUB 1000 tells the computer to start executing the group of statements starting at line 1000, and to return when it is finished. Similarly, line 80 channels program flow to the subroutine starting at line 2000. These subroutines

have not yet been written, but when they are, they will be started at the appropriate line numbers.

Line 90 checks for the possibility that the user has accidentally entered the wrong number. While entering information, it is important to watch for incorrect input. In the checkbook program, if the user inputs the wrong number, the program asks the question again.

Note that unlike GOSUB, GOTO does not require that control return to the statement below it. In fact, line 90 forms the bottom of a loop, which is normally broken on the first pass through the program.

Now the two subroutines can be written starting with line 1000. Here we want to put information about

checks and deposits in an external file on a disk or tape. But first, we need to elaborate on our algorithm a little and figure out how these data will be structured.

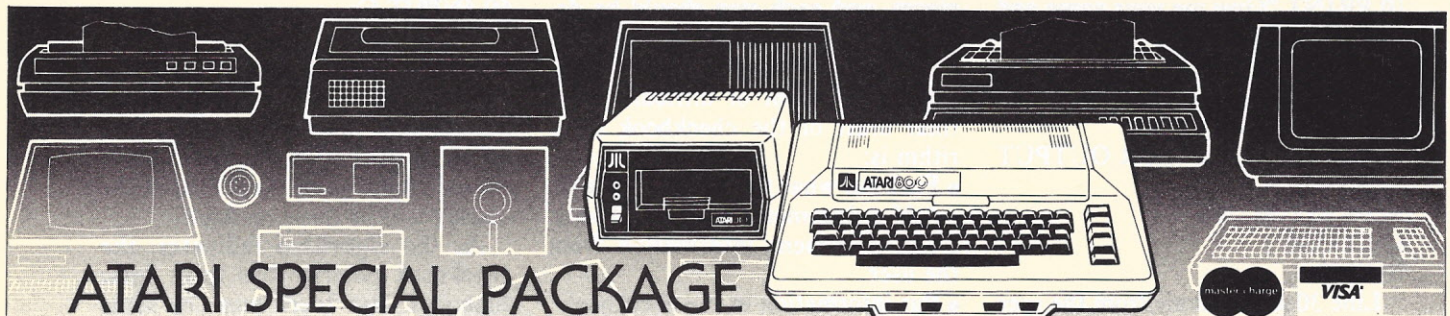
The information needed for a document is its type and number, the date, a short description, and the amount of money it involves. Here are a few examples:

```

c107 4/10/82 Groceries - 105.15
d40 4/13/82 Savings - 100.00

```

The first three columns are text and must be stored as text in memory boxes that have labels like A\$ or B\$. Since the amount is numeric, however, we want to put that in a number box with a label such as A or B. For simplicity, use A for amount. The date can't be treated like a number



ATARI SPECIAL PACKAGE

800 COMPUTER WITH DISK DRIVE \$ 1,139.00

ATARI SOFTWARE

Invt. to programg. 2	24.95
Invt. to programg. 3	24.95
Microsoft Basic	74.95
Pilot	64.95
Atari Persl.Finance	59.95
Missile Command	34.95
Asteroids	34.95
Caverns of Mars	31.95
LJK Letter Perfect	119.95
LJK Mailmerge/Utility	24.95
LJK Data Perfect	79.95
Synapse Filemgr. 800	79.95
Datasoft Text Wizard	79.95
Ghost Hunter	26.95
16K RAM	69.95
32K RAM	139.95

APPLE SOFTWARE

Micro Pro Wordstar	249.00
Micro Pro Calcstar	149.00
Magic Window	79.95
Magic Mailer	57.95
D.B. Master	169.00
Visicalc 3.3	149.95
Visiplot	139.95
Visidex	149.95
PFS Filing/Database	79.95
PFS Report	79.95
Pro Easywriter	195.00
Pro Easymailer	79.95
Raster Blaster	25.95
Snack Attack	25.95
Auto Atlas	26.95

COMPUTERS

Altos 8000-2	2895.00
Northstar Advant.	3299.00
Zenith Z-89	2149.00

PRINTERS

Epson MX-80	459.00
Okidata 82A	489.00
NEC 8023A	529.00
Diablo 630	2195.00
NEC 3510	1795.00
NEC 7710	2395.00

MODEMS

Hayes Microm. II	269.00
Hayes Smartm.	229.00
Novation DCAT	159.00

MONITORS

NEC 12" Green	179.00
NEC 13" Color	329.00
Zenith 12" Green	119.00

MEDIA

Verbatim	25.00/box
Dysan	37.00/box

unicom INC.

THE PURCHASING SERVICE FOR HOME & BUSINESS COMPUTERS
1247 LINCOLN BLVD. SUITE F. SANTA MONICA, CA. 90401 (213) 451-8089

FREE CATALOG... offering the most complete line of computer products in the country. Your satisfaction is backed by our 30 day guarantee. ALL PRODUCTS DISCOUNTED UP TO 30%. COMPARE PRICES & KNOWLEDGE. No minimum orders. Please add 3% for shipping, handling & insurance. Showroom by appt. only Monday to Friday 9:30-5:30. (PRICES SUBJECT TO CHANGE).

Select a modem for your computer...easy as ABC.

CHOOSE A. The Smart One™, Model AM232, with its own built in microcontroller. Auto Dials, Auto Answers, Auto Modes (originate/answer), "Direct Connect" for any computer with an RS232 interface...\$299.00.

CHOOSE B. The Acoustic Modem, Model AMII/A, for the Apple*. Comes complete with a powerful operating system. Supports 25 easy to use keyboard commands and operates interactively with your programs. No interface card required!...\$179.00.

CHOOSE C. The "Direct Connect" Modem, Model AMII, for the Apple*. Comes complete with a powerful operating system. Supports Auto Dial, Auto Answer, 27 easy to use keyboard commands and operates interactively with your programs. No interface card required!...\$289.00.

Be a part of the information revolution. It's fun, exciting, informative, educational. Call or write your order today. COD's accepted.



**MICROMATE
ELECTRONICS, INC.**

2094 Front Street • East Meadow, New York 11554 • Telephone 516.794.1072

All "Direct Connect" modems are FCC certified. *Registered trademark of Apple Computer, Inc.

CIRCLE 63

STOP PLAYING GAMES WITH YOUR RESOURCES!

Was financial management one of your justifications for purchasing an APPLE* computer?

Are you really managing your finances or just using an expensive calculator to help balance your checkbook(s)?

It takes a double entry system to do the job right. Why?

Less than half the financial transactions necessary to adequately manage your resources and plan your tax strategy can be accommodated with single entry systems.

How can you use a double entry system without a refresher course in accounting?

You can't, if you use software that simply automates the way people do things by hand... but, with The ACCOUNTANT, by Decision Support Software, the power of your computer is harnessed to offer you the advantages of an automated double entry system even if you don't know a debit from a credit!

'BEST PACKAGE EVALUATED'

"For the home user (and perhaps in some less complex small business), the best package we evaluated was the Accountant by Decision Support Software."

— Mind Your Business Dept., Softalk, Jan. 82

Our users are equally impressed:

"The ACCOUNTANT is not only very sophisticated and full of surprising features, such as automatic transactions and linkages to VisiCalc™, but is very easy to use".



The ACCOUNTANT includes these user oriented features:

- Menu driven operations
- Comprehensive prompting
- User defined account names
- User defined code names
- Reference to accounts and codes by name or number
- Ability to cancel operations or queries when desired
- Ad hoc queries

The ACCOUNTANT Finance Data Base System

The ACCOUNTANT is a decision support tool that provides an individual or business with timely, accurate data to plan, monitor and control their finances. The detailed records contained in The ACCOUNTANT's data base will enable you to itemize each and every legitimate tax deduction. DBCALC, a VisiCalc™ interface, retrieves data from The ACCOUNTANT's data base and creates a VisiCalc™ file of actual and projected financial data which can be used for financial simulations and tax computations.

The ACCOUNTANT requires an APPLE II with 48K, APPLESOFT on ROM, single or dual drives, and uses normal DOS 3.3 formatted disks.....\$99.95

DBCALC (with 1040 model included) requires VisiCalc™.....\$20.00

JUST RELEASED - TAX HELPER

A comprehensive model that includes instructions for calculating income taxes: information is tabulated for IRS forms 1040, schedules A, B, C, D, E, F, G, R & RP, SE, and UC. Incorporates 1981 tax changes and includes instructions for modifications to reflect 1982 tax changes. Requires VisiCalc™ and can be used with or without The ACCOUNTANT.....\$49.95

Decision Support Software

1438 Ironwood Drive

McLean, VA 22101 (703) 241-8316

APPLE™ is a trademark of APPLE Computer Inc., Cupertino, CA.
VisiCalc™ is a trademark of Personal Software Inc., Sunnyvale, CA.
Use your Visa or Mastercard. Include \$3.00 shipping and handling. VA residents add 4%

CIRCLE 27

ADVANCED

“Writing programs is like building houses. There are many elements that must be put together to construct what is needed.”

since it has slashes in it, and the computer would interpret them as division signs.

Now that we have our data format, we can write a subroutine that would look similar to:

1000 OPEN "Checkbook" FOR
OUTPUT AS FILE 1

```
1010 PRINT "Please enter a  
check or deposit..."
```

1020 PRINT "Transaction type and
number:"

1030 INPUT TS

1040 PRINT

Date (MM/DD/YY): "

1050 INPUT D\$

```
1060 PRINT "What is it for /from? ":
```

1070 INPUT WS

```
1080 PRINT "And what is the
amount?":
```

1090 INPUT A

```
1080 PRINT "Thank you, I will  
enter it into your checkbook."
```

1090 PRINT #1, T\$,D\$,W\$,A

1100 CLOSE 1

```
1110 PRINT "Okay, I have
      entered it for you."
```

1129 RETURN

A balancing act

Line 1000 of the subroutine opens the checkbook file so it can be written on.

Lines 1010–1090 obtain information about the document from the user and store it in the appropriate memory boxes. Line 1090 puts the information in file 1, another name for the checkbook file. Finally, the file is closed and control is returned to the main part of the program that called

this subroutine.

Although this subroutine was rather long, the balancing subroutine will be much shorter. It has to begin at line 2000 since that's where the main program expects it to be. To compute the current balance, the subroutine reads every document in the checkbook and totals the amounts. This process can be accomplished with the use of a loop as follows:

2000 OPEN "Checkbook" FOR
INPUT AS FILE 1

2010 B=0

2020 INPUT #1. TS, DS, WS, A

2030 $B \equiv B + A$

2040 IF (NOT EOF(1)) GOTO

2020

2050 PRINT "Your current balance
is: \$":B

WHAT HEAD CLEANING KIT DO THESE COMPANIES RECOMMEND?

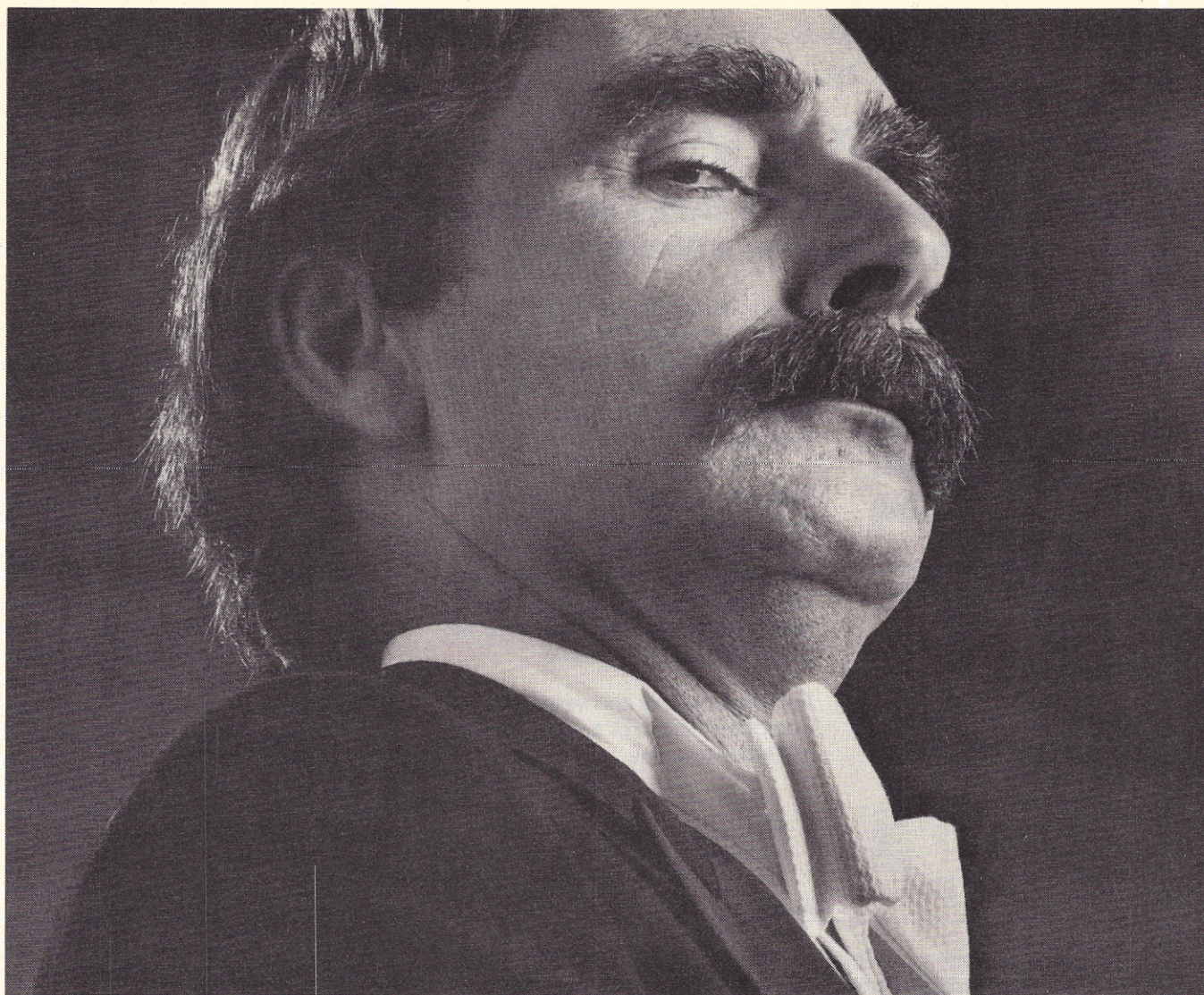
Our flexible disk drive head cleaning kit is OFFICIALLY APPROVED by more than 35 major computer companies. And for good reason. We are the innovators in the field of computer self-maintenance technology.

Now you can lower maintenance costs and reduce downtime the way disk drive manufacturers recommend. The head cleaning kit from INNOVATIVE. *The recommended leader.*



Available at retail computer stores and leading supply dealers.
Dealer inquiries welcome

INNOVATIVE COMPUTER PRODUCTS



A Case For Discrimination.

Discriminating computer users don't want the *best known* word processing software. They want the *best* word processing software.

Hewlett Packard, for instance, spent 9 months comparing 7 microcomputer word processing software systems—including the most popular brands—for distribution with the new HP125 microcomputer.

Hewlett Packard's conclusion: Spellbinder is superior to every other system evaluated.

The reason? Spellbinder's unrivalled ease-of-use and superior capabilities. Spellbinder requires fewer keystrokes for entering and editing text, and provides more flexible printing options without changing the way you enter text.

Spellbinder and an inexpensive microcomputer easily rival dedicated word processing systems costing up to *three times* more.

In addition, Spellbinder offers features for mass mailing and for professional legal texts. The price also includes forms handling and "boiler plate" features to store and merge commonly used documents, forms, and paragraphs.

Best of all, Spellbinder's lofty capabilities are available at a very competitive price. In fact, some of the bigger names in word processing packages demand a much higher price, for a package with far fewer features.

Hewlett Packard wouldn't settle for less than Spellbinder. You should be just as discriminating. See your nearest computer dealer for a demonstration of Spellbinder. Or call Lexisoft at (916) 758-3630.

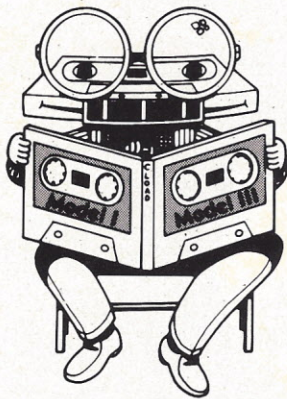
SpellbinderTM
**Spellbinder Word Processing
 and Office Management System.**

A product of Lexisoft, Inc.
 Box 267, Davis, CA 95616 □ (916) 758-3630

Has your TRS-80 Model I, Model III,
or Color Computer

READ A GOOD TAPE LATELY?

SOFTWARE CLASSICS ON TAPE EACH MONTH (nearly as cheap as a library card).



The Fine Print:
Issues are sent First Class Mail.
All issues from Oct. '78 on available — ask for list
(24 Level I issues also).
Programs are for 16K Level II, 16K Model III, and
occasionally for disks.
California residents add 6% to single copies.
Overseas — add \$10 to subscriptions, and \$1 to
single copies. Sent AO rate.

The Bottom Line:

1 year (12 issues)	\$42.00
6 months (6 issues)	\$23.00
Single copies — Back issues	\$4.50
Good Games #1	\$12.00
Adventures #1	\$13.00

TRS-80 is a trademark of Tandy Corp.
MasterCard/Visa/Gold also welcome

Is your TRS-80 tired of looking at the
same ol' programs? Is software senility
setting in? **CLOAD** Magazine is just
what your computer needs to stimu-
late those RAM chips and keep its
memory fresh.

CLOAD Magazine is a cassette tape
with 6 to 8 programs on it, which your
computer will receive, by First Class
Mail, every month! Just **CLOAD** and
RUN. Games, tutorials, practical pro-
grams, and utilities to keep your TRS-
80's video bright and alive.

Put more culture and variety in your
computer's life. Get a subscription to
CLOAD Magazine.

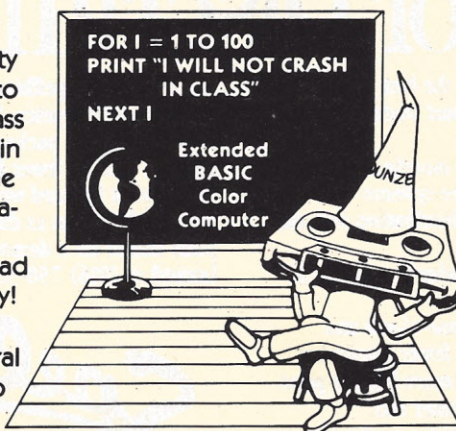
CLOAD MAGAZINE INC.
P.O. Box 1448, Santa Barbara, CA 93102
(805) 962-6271

CIRCLE 76

Trying to educate your CoCo can be a trying experience. Pounding
on the keyboard is not the positive reinforcement your computer
needs. **CHROMASETTE** Magazine is the civilized way to introduce
your computer to the world of good software.

With **CHROMASETTE** Maga-
zine, CoCo gets both quantity
and quality. Every month, 6 to
8 programs arrive by First Class
Mail. No need to type them in
— **CHROMASETTE** Magazine
is a cassette tape with educa-
tional, practical, utility, and
game programs on it. Just load
and run. Ah, the life of luxury!

Give your computer a cultural
lesson. Get a subscription to
CHROMASETTE Magazine.



The Bottom Line:

1 year (12 issues)	\$45.00
6 months (6 issues)	\$25.00
Single copies	\$5.00

Calif. residents add 6% to single copies.
Overseas — add \$10 to subscriptions, and \$1 to
single copies. Sent AO rate.

The Fine Print:
Issues are sent First Class Mail.
All issues from July 81 on available — ask for list.
Programs are for the Extended BASIC model only.

Chromasette Magazine

P.O. Box 1087 Santa Barbara, CA 93102 (805) 963-1066

MasterCard/Visa welcome!

CIRCLE 79

ADVANCED

2060 CLOSE 1
2060 RETURN

Line 2000 of this loop opens the
checkbook so it can be read from the
beginning of the file. Line 2010 starts
the balance off at zero, and the loop
of statements 2020–2040 computes
the balance. Line 2020 reads a docu-
ment from the file, and line 2030 ad-
ds the amount to the current balance.
To complete the loop, line 2040
checks to see if we have reached the
end of the file (EOF). If not, the com-
puter spins through the loop again
and adds another amount to the run-
ning balance. If EOF is reached and
all the amounts have been summed,
the processor breaks out of the loop
and goes on to line 2050. There the
balance is reported, the file is closed
and control is returned to the main
program.

Now that the subroutines have
been coded, it might seem that the
program is finished. This is not the
case as we can see by looking again at
the main section of the program.

```
10 PRINT "Which transaction do
    you want to do?"
20 PRINT "(1) Add a check or
    deposit to your checkbook"
30 PRINT "(2) Balance
    your checkbook"
40 PRINT
50 PRINT
60 INPUT C
70 IF (C=1) THEN GOSUB 1000
80 IF (C=2) THEN GOSUB 2000
90 IF ( (C>2) or (C<1) ) THEN
    GOTO 10
```

After the user enters a choice and
completes a transaction, control re-
turns to line 80 or 90 (the last line
after the calling statement). Since
the variable C still contains a valid
choice, control drops past line 90. At
this point a disaster occurs; the next
highest line of the program, line
1000, is executed. A subroutine
should never be executed unless it is
called. This is not what the algorithm
was designed to do. After a trans-
action is completed, we want the pro-
(continued on page 160)



**In an age when new standards are constantly emerging,
one disk consistently meets or exceeds them all.**

Maxell. The Gold Standard.

Not all disks are created equal. Some are better than others. To find out what's best for you, look for Maxell disks. They now carry the Gold Standard symbol of quality. It's your assurance Maxell disks meet or exceed every definition of quality. No matter who establishes it. We've earned this universal superiority by never relaxing our uniquely demanding quality control. Every aspect of manufacturing is checked, then checked again.

Your benefits are many. Take the perpetual problem of drop-outs. A drop-out is a tiny defect that wastes time and degrades computer accuracy and performance. Now that you understand what a drop-out is, forget it. Maxell disks don't have any. Each disk comes to you certified

drop-out free at the time of manufacture. You can depend on this quality protecting your valuable programs and programming time, indefinitely. We've run disks over ten million passes under conditions designed to find weak points and wear. We couldn't. And you won't.

There is a Maxell disk for the floppy system you use, or plan to use. Check your computer's instructions. Or write for our complete, highly informative brochure.

When you set the Gold Standard as your level of quality, you'll benefit from improved disk performance, immediately. Bank on it.



maxell®

Maxell Computer Products Division, 60 Oxford Drive, Moonachie, N.J. 07074, 201-440-8020

Radio Shack Updates Product Line; HP, NEC Announce New Systems

TECHNOLOGY FROM TANDY ENSURES COMPATIBILITY

New products abounding from Radio Shack all bear the same feature: assurance from Tandy that the company is attempting to protect the consumer from both incompatibility problems and the technology-time-trap, wherein technological advances can cause rapid product obsolescence.

As John Roach, president and CEO at Tandy, recently told an audience of investment analysts, "We're at war with anyone who has anything to sell." And the ammunition is there: The TRS-80 Model 16 Computer featuring 16-bit technology and a multiuser operating system; a \$1500 Model 16 Enhancement Option that upgrades a TRS-80 Model II to provide it with the 16-bit, dual-processor, multiuser power of the TRS-80 Model 16; the TRS-80 DT-1 Video Data terminal for traditional terminal applications, multiuser applications with the Model 16, and remote communications with time-sharing networks; the new \$300 model PC-2 pocket computer with a capability for internal expansion with plug-in RAM and/or ROM modules; and 10 new home and classroom programs developed by the Children's Television Workshop that combine graphics, animation and sound.

Because the Model 16 has the Z80A microprocessor (in addition to a 16-bit MC68000 microprocessor which increases memory and speed), the TRS-80 Model II and the Model 16 are software compatible. In addition, the Model 16 was designed for expansion to multiuser operations

with the addition of one or two terminals.

The system is also compatible with Radio Shack's ARCNET local network, which supports any combination of as many as 255 Model II and Model 16 computers.



Upgrading with the Model 16 Enhancement Option gives Model II owners all of the advantages of a MC68000 16-bit CPU with 128k of user memory.

Seeing things clearly

Radio Shack's advanced video data terminal, the DT-1, priced at \$699, can emulate the protocols of standard terminals, with configurations selected from the keyboard.

The custom-programmed high-speed 8-bit microprocessor inside the DT-1 is the basis of its high performance, flexibility and low price, the company says. The DT-1 can be configured to emulate the Televideo 910, Lear-Siegler ADM-5, ADDS 25 or Hazeltine 1410 terminals.

One in the hand

The PC-2 handheld computer offers advanced programming, operating and communications features that promise to greatly extend the reach of portable computing. These capabilities open up application areas for the PC-2, including engineering, scientific and medical calculations; and banking, credit, insurance, investment and financial applications.

Its advanced features include the capability for internal expansion with plug-in RAM and/or ROM modules, and for external expansion through a 60-pin I/O bus connector. The PC-2 features a 16k (ROM) Extended BASIC



language interpreter with the ability to process words and messages, programmable function keys and an LCD display with upper- and lowercase, scientific and user-definable characters.

Learning with color

Children's Television Workshop will develop a series of 10 game-style software packages combining color graphics, animation and sound exclusively for the Radio Shack TRS-80 Color Computer. The first of these programs will focus on skills for grades four through six. Later, programs will be offered for pre-school through grade three. These game activities are designed to encourage repeat play, with performance scoring to provide additional improvement motivation.

For more information on all of these products, contact your local Radio Shack Store, Computer Center or Radio Shack, 1800 One Tandy Center, Fort Worth, TX 76102.

HP HERALDS PROFESSIONAL SOLUTION

The CP/M-compatible HP-87, the newest member of Hewlett-Packard's Series 80 family of personal computers, is designed to provide complete solutions for engineering, science and business professionals. The system, with its totally integrated package, fills the professional's need for a completely portable (22 lbs.) and powerful personal computer.

All of HP's personal-computer peripherals are compatible with the HP-87, including the new HP 7470 Graphics Plotter. The new system features a high-resolution, integrated 80-column text-and-graphics display, enhanced HP BASIC programming language and expanded software support, and user memory that can be increased from the built-in 32k to 544k.

Software solutions for the HP-87 come from HP, contracted independent software suppliers, and from the many programs that run on all CP/M-compatible personal computers.

The HP-developed software provides solutions to the main problems facing analytical professionals. Software pacs range from the Graphics Presentations Pac used for generating professional-quality graphs, charts and text slides, to professional applications pacs that concentrate on areas such as statistics, AC circuit analysis and financial decisions.

Two new HP "SuperPacs" offer comprehensive solutions in statistics and electronics engineering by packaging three software pacs at a discount. The first SuperPac, Statistical Analysis, includes General Statistics, Basic Statistics and Data Management, and Regression Analysis, all for \$200—or \$85 less than the unbundled price of the three pacs. The second pac, Electronics Engineering, consists of the Math Pac, AC Circuit Analysis, and Waveform Analysis, also for \$200.

The HP-87's built-in CRT display is 80 columns wide and, with one command, can be set to display either 24 or 16 lines. Text or graphics can be displayed, and the user can easily switch back and forth from graphics display to program and text. In the graphics mode, display resolution is 544 by 240 dots, designed for clear, accurate depiction of graphs and data charts. The screen is optically coated for low glare.

The HP-87 is upwards-compatible with the HP-85, meaning programs developed for the HP-85 will run on the new system. The HP-87's BASIC features commands are designed to make creating and plotting charts and graphs easy, and enhance sophisticated programming. These programming enhancements include string arrays (an aid for programs that handle a lot of text), multi-character variable names, callable line labels (in addition to line numbers in programs), and indented program listings.

For more information: Inquiries Manager, Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303, or for the locations of the nearest HP authorized personal computer dealer, call (800) 547-3400.



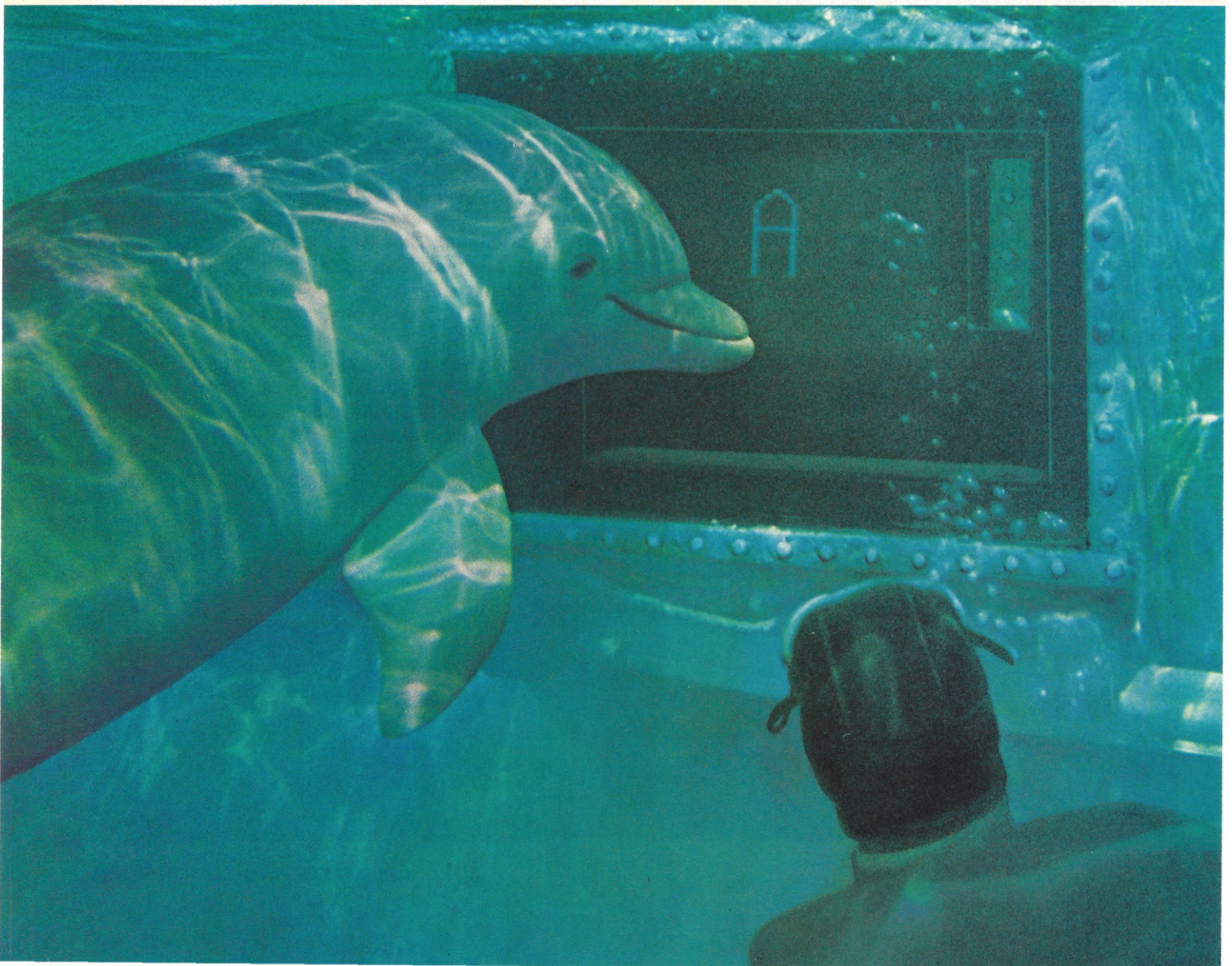
Make waves with an Apple.

If you'd like to spend more of your research budget on research and less on computer costs, consider the discoveries of Dr. John Lilly and the Human/Dolphin Foundation.

Dolphins vocalize at 2,000-40,000 Hz (compared with 300-3,000 Hz for humans) and "converse" 10-15 times faster than their bipedal brethren.

In 1968, Dr. Lilly's interspecies communication experiments stalled for lack of affordable computer power to bridge this gap. But today, with the help of Apple Personal Computers and a DEC® PDP/11, things are going swimmingly.

A new program called JANUS (Joint Analog Numeric Understanding System) uses a 48K Apple II Plus to generate dolphin-comprehensible wave forms matched to dolphin-



viewable symbols on an underwater screen. Dolphin responses are analyzed through a PDP/11. A second Apple monitors and analyzes data from all phases of the experiment.

The objective is to create an artificial language that is mutually intelligible to both species, with a beginning vocabulary of 48 sound/symbol morphemes associated with objects, locations and actions.

But, with all the micros available, why pick Apples?

Because they're inexpensive enough to allow the use of a stand-alone computing system for dedicated functions.

Because they're portable and rugged enough for field use in a wide range of environments.

And because they can be configured for many scientific

applications with no special I/O devices. (Apple's IEEE-488 interface card will program and operate virtually any test, measurement or control instrument.)

There's more software available for Apples than for any other microcomputer on

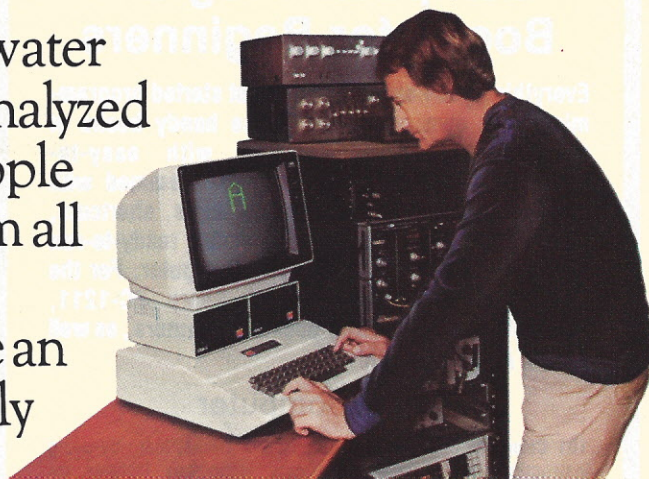
the market. And more full service dealers worldwide.

Communicate with one and find out how an Apple can make waves for you, whatever your, ah... porpoise.

The personal computer.



The Human/Dolphin Foundation is a non-profit research organization. For more information, write Dr. John Lilly, P.O. Box 4172, Malibu, CA 90265. For the authorized Apple dealer nearest you, call (800) 538-9696. In California, call (800) 662-9238. Or write: Apple Computer Inc., 10260 Bandle Dr., Cupertino, CA 95014.



	APPLE II	APPLE III
Maximum RAM	64K	256K
I/O	8 expansion slots	4 expansion slots + built-in interfaces for disks and printer.
Disk Drives	Up to 6 140K floppies.	Built-in 140K + up to 3 additional floppies. Available with ProFile™ 5MB hard disk.
Languages	BASIC, Pascal™, PILOT, COBOL, Assembly.	Enhanced BASIC, UCSD Pascal™, Assembly.
Keyboard	Fixed 96-character ASC II.	Fully programmable 128-character, includes numeric keypad.

Computer Program Books for Beginners

Everything you need to know to get started programming your own computer. These handy books of programs, each jam-packed with easy-to-understand info for beginners, are crammed with hundreds of tips, tricks, secrets, hints, shortcuts, techniques, plus hundreds of tested ready-to-run programs. For the TRS-80 Color Computer. For the TRS-80 Pocket Computer and Sharp PC-1211, PC-1500, Casio FX-702P pocket computers, as well as for Apple and IBM.

Color Computer

- 101 Color Computer Programming Tips & Tricks**, learn-by-doing instructions, hints, secrets, shortcuts, techniques, insights, for TRS-80 Color Computer, 128 pages **\$7.95**
55 Color Computer Programs for Home, School & Office, practical ready-to-run software with colorful graphics for TRS-80 Color Computer, 128 pages. **\$9.95**
55 MORE Color Computer Programs for Home, School & Office, sourcebook of useful type-in-and-run software with exciting graphics, for TRS-80 Color Computer, 112 pages. **\$9.95**
The Color Computer Songbook, 40 favorite pop, classical, folk & seasonal songs arranged for TRS-80 Color Computer; ready-to-run music programs, 96 pages. **\$7.95**
My Buttons Are Blue and Other Love Poems from the Digital Heart of An Electronic Computer, for poetry lovers, computer lovers, a high-tech classic, 66 heartwarming poems written by a TRS-80 Color Computer, 96 pages. **\$4.95**
Color Computer Coding Form, handy preprinted programming worksheets make writing software easy, fun, 40-sheet pad. **\$2.95**

Pocket Computer

- 101 Pocket Computer Programming Tips & Tricks**, secrets, hints, shortcuts, techniques from a master programmer, 128 pages. **\$7.95**
50 Programs in BASIC for Home, School & Office, sourcebook of tested ready-to-type-in-and-run software for TRS-80 and Sharp pocket computers, 96 pages. **\$9.95**
50 MORE Programs in BASIC for Home, School & Office, ideal source for lots more useful software for TRS-80 and Sharp pocket computers, 96 pages. **\$9.95**
Murder in The Mansion and Other Computer Adventures, with 24 game programs: murder mystery, space, adventure, loads of fun for TRS-80 and Sharp pocket computers, 96 pages. **\$6.95**
Pocket Computer Programming Made Easy, new fast 'n easy way to learn BASIC, make your computer work for you, for TRS-80, Sharp, Casio pocket computers, 128 pages. **\$8.95**
35 Practical Programs for the Casio Pocket Computer, book of useful type-in-and-run software for the FX-702P, 96 pages. **\$8.95**
Pocket-BASIC Coding Form, preprinted program worksheets make writing programs a breeze; for TRS-80, Sharp, Casio pocket computers, 40-sheet pad. **\$2.95**
Universal BASIC Coding Form, programming worksheets for anybody writing in BASIC for any computer system, make writing program lines easy and fun. 40-sheet pad. **\$2.95**

Order direct from this ad. Send check or money order. Include \$1 shipping for each item ordered up to a maximum of \$3 shipping. Or write for our free catalog. Mail your order to:

ARCsoft Publishers

Post Office Box 132Y
 Woodsboro, Maryland 21798
 (301) 663-4444

HARDWARE OF THE MONTH

COMBINING FEATURES FOR OPTIMUM EFFICIENCY

The PC-8000 Series Microcomputer System has been designed for optimum office, home, plant, store, lab, shop or school performance, according to NEC Home Electronics USA.

The system includes the 64k PC-8001A Microcomputer, the PC-8012A I/O Unit, a PC-8031A Disk Drive and an NEC Color or Monochromatic (green screen) monitor. A Z80A equivalent microprocessor provides access to CP/M software, and instant access to dozens of packages. Accounting, word processing, file managers, engineering and math routines, as well as FORTRAN, COBOL and Pascal languages promise versatility.

Critical features are positioned for access and service. A numeric keypad and five user-programmable function keys, which can activate up to 10 different user-defined routines using the shift key, highlight the unit. N-key rollover input allows high-speed typing.

With the green-screen monitor the price of the series is \$2849. With the NEC color monitor the price is \$3634.

For more information: NEC Home Electronics USA, 1401 Estes Ave., Elk Grove Village, IL 60007; (312) 228-5900.

THE COMPUTER "BOSS"

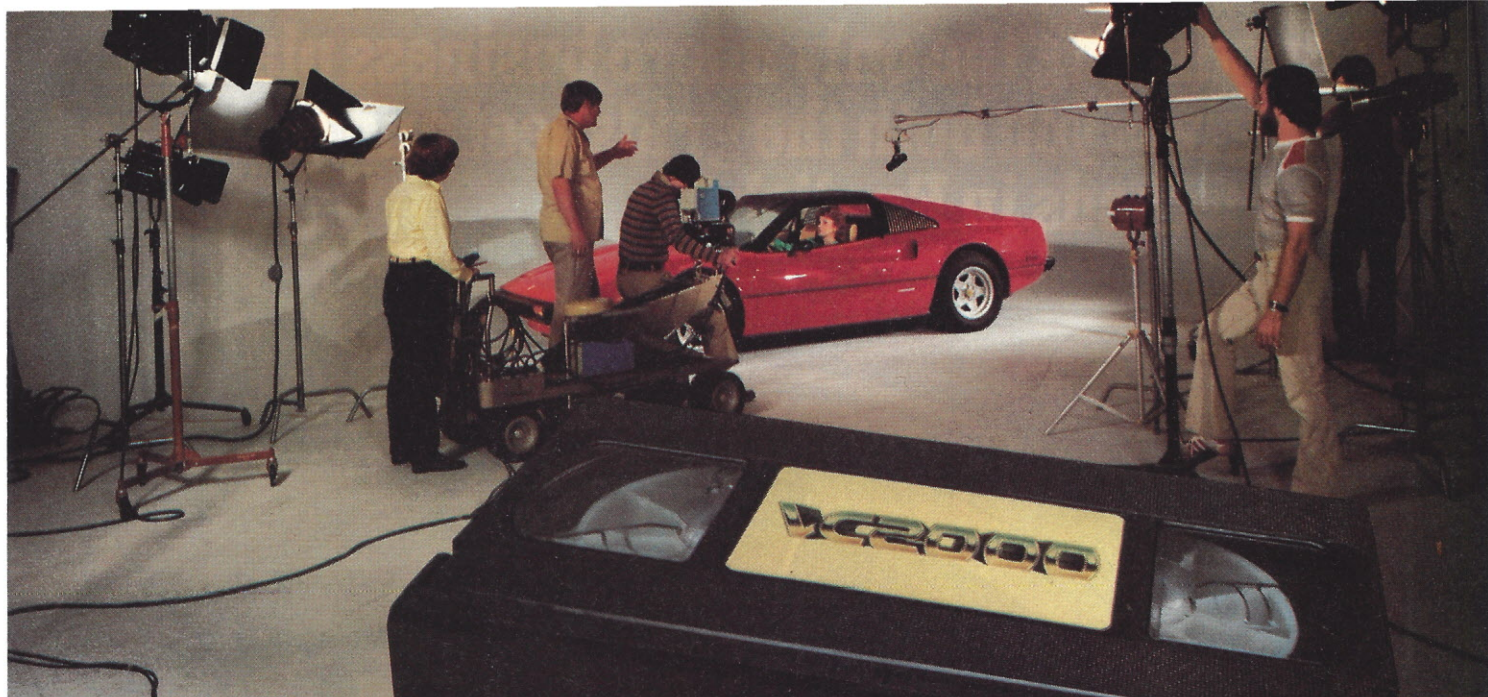
Based on the Motorola MC68000, the Fortune 32:16 is a flexible computer system that can handle all the requirements of a one-person office. The system also expands to accommodate the small- to medium-sized business or department of a large corporation.

The product features an operating system derived from Bell Lab's UNIX system, and has a full range of business-application software packages including accounting and distribution, budgeting, forecasting and financial modeling. To make the system easy to use, Fortune Systems has developed a comprehensive set of user-oriented support aids encompassing everything from the initial system set-up to application conversion.

The basic Fortune 32:16 includes a 32-bit microprocessor with a 16-bit data path, expandable memory (128k to 1 megabyte); a 1 megabyte 5¼-inch floppy disk drive; a keyboard; and a 12-inch video display. A 5¼-inch Winchester disk drive, with optional 5, 10 or 20 megabytes of storage, is available for applications that require more storage capacity.

Fortune Systems' single-user configuration has been designed to be inexpensively expanded to a multiuser, multiapplication system. This basic system can also be field upgraded to a multiuser, time-sharing system that can be networked using Xerox's Ethernet.

The Fortune 32:16 supports BASIC, COBOL, FORTRAN, Pascal and C programming languages. The



Let us show you how to shoot video like a pro

In my videotape production company, our crews turn out award-winning commercials, sales films, and features for some of the largest companies and television networks in the country. Now we would like to share our vast experience and award-winning capabilities to help you shoot your video with a professional-quality look—through an exciting new concept called **VC 2000 An Association of Video Camera Owners**.

Now, for a limited time, only when you join VC 2000, I'll send you FREE our one-hour instructional tape "Shooting Home Video: The Basics."

There's nothing like it on the market. In an entertaining, step-by-step format, our directors, cameramen, engineers and editors share their trade secrets. This could be the most valuable videotape a video enthusiast could ever own . . . and open up possibilities you never thought possible.

In one hour, I can demonstrate more techniques than you'd get from reading a dozen books.

You'll learn:

THE VIDEO CAMERA: How to use its full potential to make your tapes really come alive.

VIDEO SOUND: Get clean, true sound under every shooting situation.

VIDEO LIGHTING: Achieve that distinctive professional look, inside and outside.

VIDEO COMPOSITION: Apply the five artistic guidelines for winning composition.

VIDEO DIRECTING: Think like a director, utilizing the principles of continuity, to make the simplest situation a story.

Plus...look at all the other great member benefits you'll get with this introductory offer to join VC 2000:

- A five year membership card.
- A \$20 discount on our instructional videotape "How to Set Up Your Own Video Business."
Learn about possible tax advantages of working for yourself in the exciting videotape production business...the services you can offer and how to sell them.

- A library of other professionally-produced instructional videotapes at special member prices, like:
 - HOW TO SHOOT A WEDDING
 - HOW TO SHOOT A SPORTS EVENT
 - HOW TO SHOOT FAMILY VIDEO "ALBUMS"
 - PLUS MANY MORE
- FREE quarterly newsletter with state-of-the-art developments in the world of video.
- Discount prices on blank cassettes and equipment.

Don't miss out on this exciting introductory offering. Send in this coupon and your check today. Or use our toll-free number for further information, or to charge your membership to your VISA or MasterCard account. Offer ends June 30, 1982.

**All this for
only \$90.00**

Jim Kartes
Jim Kartes, Kartes Video Communications, Inc.

P.S. Before you buy a video camera or recorder, call us first.

Accept this payment as my enrollment fee in VC 2000 and send me my FREE 60-minute instructional tape **SHOOTING HOME VIDEO: THE BASICS.**

I will need: ☐ VHS Cassette ☐ BETA II Cassette

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

☐ Also send me the program: **HOW TO SET UP YOUR OWN VIDEOTAPE BUSINESS** at the discount price of \$45.*

Enclosed is my check for ☐ \$90.00 ☐ \$135.00 (*IN residents add \$1.80 sales tax)

Bill my ☐ VISA or ☐ MasterCard or ☐ American Express

Acct. No. _____ Expires _____

Signature _____

☐ I do not presently own a videotape camera but am interested in more information on VC 2000. For further information in a hurry, call tollfree: 1 800 428-6163 (except in Alaska or Hawaii), 1 800 692-6048 (in Indiana).

VC2000 TM

VC 2000
10 East 106th Street
Indianapolis, IN 46280

Announcing the only micro business planner that gives you both the gridsheet and command file methods in English.



(And even if you don't know what that means, you can still save money with it.)

TARGET MasterPlanner.™ The first and only business planner for microcomputers that lets you use both the popular "calc" gridsheet method, *and* the powerful, logic-driven command file approach of mainframes. On top of that, MasterPlanner works in English. And it's yours for just \$495.

Beginning planners can use it easily. Experienced planners can use it easily. MasterPlanner handles everything from basics like budgets and balance sheets all the way up to very sophisticated procedures needed in complex businesses.

This is mainframe power translated to micro simplicity—a flexible, easy-to-use tool that helps your company plan to reduce risk in these uncertain business times. And you own it for only \$495.

You have to see MasterPlanner work to believe all you can do with it. Call or write for the name of your nearest dealer.

Comshare Target

Suite 200, 1935 Cliff Valley Way Atlanta, Georgia 30329
404/634-9535

HARDWARE OF THE MONTH

80-column by 25-line alphanumeric video display has a 12.9-inch, non-glare, tilt and swivel screen.

The basic Fortune 32:16 configuration sells for \$4995.

For more information: Fortune Systems, 1501 Industrial Rd., San Carlos, CA 94070; (415) 595-8444.

MASS STORAGE FOR APPLE III

Corvus Systems has extended its mass-storage, disk-systems product line to include Apple III personal computers. The Apple III mass-storage system is based on high-capacity 5 to 20 megabyte Winchester disk-drive systems. All incorporate an intelligent disk controller, a proprietary controller, software and an Apple III interface designed to require no changes in applications programming.

The Apple III mass-storage systems are offered with both 5¼-inch and 8-inch Winchester disks ranging in capacity from 5 to 20 megabytes. Prices range from \$3750 to \$6450.

The Z80-based intelligent controller developed by Corvus for its mass-storage systems assures high-speed operation and response times. Only minimal software support is required, the company says. Firmware for the controller also supports features such as sector buffering, automatic error retries, diagnostics, transparent formatting with CRC error detection, and high-speed data transfer using direct-memory access (DMA) to RAM within the controller.

For more information: Corvus Systems, 2029 O'Toole Ave., San Jose, CA 95131; (408) 946-7700.

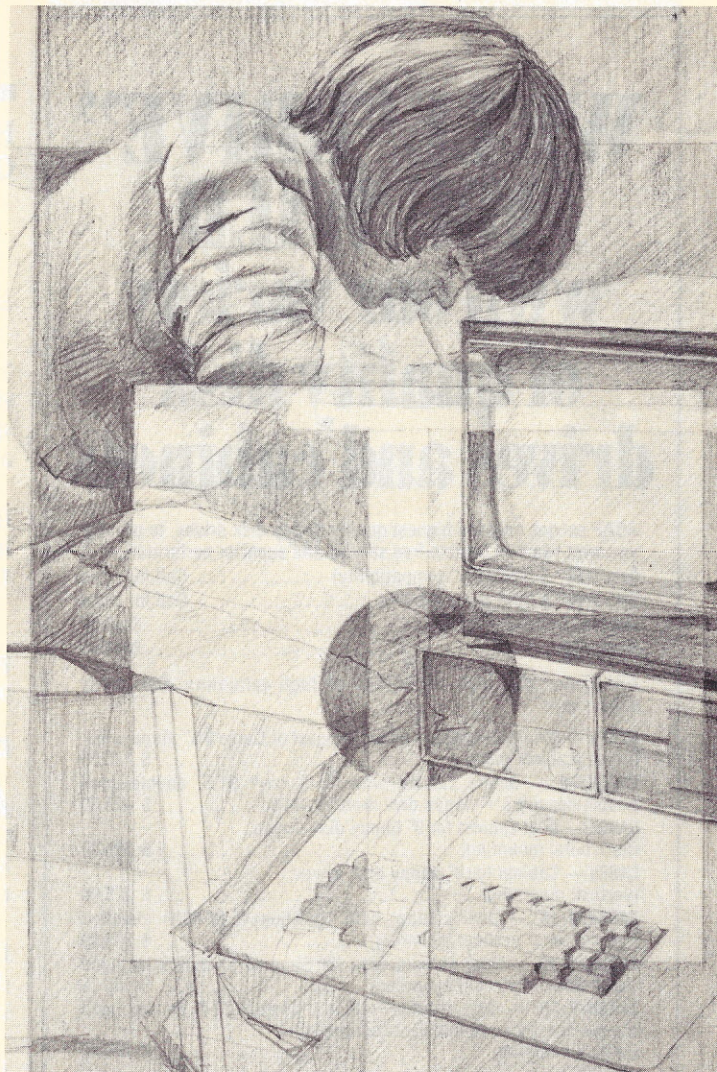
TWO-PEN GRAPHICS PLOTTER

The HP 7470 is a two-pen graphics plotter that produces pie, bar and line charts, technical drawings, maps, transparencies, and other visual presentations of business and scientific data. It is also compatible with the Hewlett-Packard Series 80 and 125 personal computers, including the HP 87, as well as personal computers from IBM, Apple and Commodore.

At the heart of the new plotter is a micro-grip drive technology that moves paper and pen simultaneously. With a resolution of 25 µm (1/1000 inch) and repeatability of 100 µm, the HP 7470 features a pen acceleration of 2 Gs and a pen-down velocity of 35 cm/sec (15 inches/sec) to a pen-up velocity of 50 cm/sec (20 inches/sec).

In addition to built-in, text-character generation (including European character sets), the plotter has a scaling ability, automatically reconfiguring a graphic or character to fit within a certain area.

Besides the HP family of fiber-tip pens (10 colors, two-line widths), the pen stable can accommodate transparency pens (seven colors, two-line widths) to produce overhead projections.



Addison-Wesley's Micro-Education Support System Series

Software for Administrators

So you can spend more time with people
and less with papers.

The paperwork school administrators must handle is endless. So just think of all the benefits our microcomputer software will bring.

BURSAR™: Student Activity Fund Accounting System, EQUIP™: School Equipment Inventory System, and PURCHASE™: Annual School Purchasing System are the initial three publications in the series. Each software package is easy to learn and simple to use. No prior computer experience is necessary.

These software packages are available for the TRS-80 Models I and III, and the Apple II. Each complete package is \$195.

BURSAR™, EQUIP™ and PURCHASE™ are trademarks of Addison-Wesley Publishing Co. TRS-80 is a trademark of Radio Shack/Tandy Corp. Apple is a trademark of Apple Computer, Inc.

CIRCLE 32

Software Marketing

Addison-Wesley Publishing Company, Inc.
Reading, MA 01867

WE'LL "DRIVE" YOU WILD with our variety of quality disk drives and cabinets

ASAP carries only the highest quality floppy disk drives, to provide you with years of trouble-free service and superior performance.

Data Trak™ 5 (ANSI 5¼" compatibility) Call for price
Data Trak™ 8 (IBM compatibility) Call for price
Model 801 (standard floppy) \$400.00
Model 850 \$640.00

ASAP also provides a full line of high reliability disk drive subsystems*

CAB5V — Single cabinet for either Shugart or Qume 5¼", floppy disk drives (cabinet only) \$ 75.00

CAB5V/1Q — Single cabinet with (1) Qume® DT-5, double-sided double-density 5¼" floppy disk drive installed \$ 425.00

CAB8H — Dual cabinet for 8" floppy disk drives (horizontal mounting) \$ 225.00

CAB8V — Cabinet for 8" floppy disk drives (vertical mounting) \$ 225.00

CAB8H/V+1S — Dual cabinet with (1) Shugart SA801R installed (horizontal or vertical mounting) \$ 675.00

CAB8H/V+2S — Dual cabinet with (2) Shugart SA801R's installed (horizontal or vertical mounting) \$1055.00

CAB8H/V+1Q — Dual cabinet with (1) Qume® DT-8 double-sided double-density drive installed (horizontal or vertical mounting) \$ 750.00

CABH/V+2Q — Dual cabinet with (2) Qume® DT-8's double-sided double-density drive installed (horizontal or vertical mounting) \$1225.00

HDC8/1HD — Cabinet with (1) Priam 10 megabyte hard disk drive with Microbyte Controller Call for price

HDC8/1F+1HD — Cabinet with (1) Qume® DT-8 double-sided double-density drive, and (1) Priam 10 megabyte hard disk drive with Microbyte Controller Call for price

CAB8V/2F-9SMB — Desk top cabinet for (2) 8" Shugart or Qume floppy disk drives, 9-slot motherboard, card cage, fan, dust filter, power supply, and all power and drive cables Call for price

X5 — Cabinet for desk top mainframe (small power supply) \$ 200.00

8000 — Cabinet for desk top mainframe (standard power supply) \$ 255.00

*All cabinets come complete with power supply, fan and internal cables.

ASAP offers a 30-day/buyer protection policy: full money-back guarantee if not totally satisfied.

Ordering information: name, address, phone; ship by: UPS or truck. Please call for shipping charges.

Terms: We accept cash, check, money orders, Visa and Master Charge (U.S. funds only). Tax: 6% Calif. res. COD's and terms available on approval (school PO's accepted).

asap
computer
products, inc.

1198 E. Willow St., Signal Hill, CA 90806

Toll free outside California:

(800) 421-7701

Inside California:

(213) 595-6431

(714) 891-2663

HARDWARE OF THE MONTH

Other features include a damping mechanism that prevents pen damage, a velocity slow-down mode to suit special drawing conditions, and a "view" mode that stops all plotting activity for review of the graphic.

The unit is equipped with one of two standard interfaces: HP-IB and RS-232-C. The plotter measures 17 inches wide by 14 inches deep by 5 inches high, weighs 12 1/2 pounds, and needs only 25 watts of power to operate.

The price of the HP 7470 is \$1550.

For more information: Inquiries Manager, Hewlett-Packard Co., 1820 Embarcadero Rd., Palo Alto, CA 94303.

COMPATIBLE COLOR MONITOR

Amdek's new 16-color high-resolution, Color II Monitor is directly compatible with the IBM Personal Computer. The 13-inch TTL RGB video monitor has an 80 by 24 character-display capability and 560 (H) by 260 (V) resolution for accurate reproductions.

The Color II features front-mounted controls for fast fine tuning and cabinet styling to match the IBM. For direct connection to the computer, the monitor also comes complete with an access cable.

Amdek's DVM (Digital Video Multiplexor) Interface Board makes Apple II computers compatible with the Color II. An access cable for The Apple II and III is also included. The DVM is software programmable to allow transparent operation, and is parallel with Apple text and graphic modes. It has four channels, three of which can multiplex the existing Apple text. The fourth channel makes the 80-character-line video board possible.

The DVM board enables the user to turn the three-color channels on or off by software control. For example, the red and blue can be turned off when the 80-character channel is on, resulting in a green-phosphor video presentation. The board may occupy any slot in the Apple II and features low-power consumption.

By plugging the DVM into the I/O bus on the Apple II, the Color II can pick up the necessary signals from the motherboard. In addition, the computer obtains the Color II's RGB and TTL input without interfering in normal operation or software compatibility.

The price of the Color II is \$999.

For more information: Amdek, 2420 E. Oakton St., Suite E, Arlington Heights, IL 60005; (312) 364-1180.

MAKING LOW-COST CONNECTIONS

DESNET is a new concept in low-cost local area networking. It is independent of processors and protocols, and supports all network interconnect media (cable types).

For \$2995, DESNET can connect combinations of up to nine unlike processors and one Centronics-compatible interface device at the same location. The cost of con-

Ten reasons why your floppy disk should be a BASF FlexyDisk®.

More than four decades of experience in magnetic media—BASF invented magnetic recording tape, the forerunner of today's wide range of magnetic media, back in 1934, and was the first independent manufacturer of IBM-compatible floppy disks.

Tough Tyvek sleeve—no paper dust, no static electricity.

Special self-cleaning jacket and liner help eliminate data errors and media wear and tear.

Packaging to suit your requirements—standard flip-top box, Kassetette 10® storage case, or bulk pack.

Center hole diameter punched to more accurate standards than industry specifications, for top performance.

100% certification—every single disk is tested at thresholds 2-3 times higher than system requirements, to be 100% error-free.

Bi-axially oriented polyester substrate—for uniform and reliable performance year after year.

For the name of your nearest supplier, write BASF Systems, Crosby Drive, Bedford, MA 01730, or call 617-271-4030.

Cross-linked oxide coating—for low head wear and long trouble-free media life.

Total capability—one of two manufacturers in the world that makes both 8" and 5.25" models, has tape and disk experience, and manufactures floppy disk drives.

Double lubrication—lubricants both in the formula and on the disk surface, to minimize media wear due to head friction.



BASF

Floppy Disks Mag Cards Cassettes Computer Tapes Disk Packs Computer Peripherals

CIRCLE 26

HARDWARE OF THE MONTH

necting each additional device, above the first 10, can be as low as \$100 each.

To connect to DESNET, an RS-232-C serial port or a Centronics-compatible parallel port is required. The product supports interconnect media; and baseband, broadband, fiber optic, or telephone lines via an internal modem.

Initial DESNET product offerings will be the NIB-S100 board series and the NIS-1000, a self-contained network system.

The NIB-S100 products are priced from \$795 and the NIS-1000 products are priced from \$1500.

For more information: DESTEK, 1923 Landings Dr., Mountain View, CA 94043; (415) 968-4593.

A HOUSE FOR THE COMPUTER

The Model 5000/D Computer Console is a specially designed, functional and portable cabinet that houses most of the components of a personal-computer system. In addition to providing space for the computer and disk drives, the console includes a bookshelf for manuals, a top support for a printer or CRT terminal, and a slide-out stabilizer for servicing heavy units in extended position.

For further service access, the hinged rear door can be lifted off entirely. Computer units are placed on sliding shelves, eliminating the need to mount rack slides on each chassis.

The price is \$695.

For more information: Micro Solutions, 6305 Arizona Ave., Los Angeles, CA 90045; (213) 398-4203.

PORTABLE PERIPHERALS

The EXECUPORT 430 is a full-feature, keyboard-printing terminal with standard RS-232-C and current loop interfaces. For interface flexibility, the terminal's operational modes may be set from the keyboard. Such characteristics as baud rate, data pacing, disconnect and 20-character answer back are also chosen by this method.

Compact size (12 by 14 inches, 12 pounds) makes the 430 an ideal personal printing terminal, combining both data-entry and hard-copy printout functions. The terminal is priced at \$995.

The EXECUPORT 440 is a keyboard teleprinter featuring an internal 103-style modem intended for direct connection to the telephone line via a modular jack. This teleprinter also has all 430 terminal features, including the RS-232-C interface. The 440 is suitable for time-sharing and other remote-data inquiry applications. It sells for \$1195.

The 400 Series features a dot-matrix impact printhead. Design innovations have reduced drive requirements and have improved printhead life. A ribbon cartridge provides

clear copy and easy replacement.

Direct motor feedback from the step motor that drives the head to the terminals' Z80 microprocessor produces precise dot alignments. Effectively a brushless DC motor approach, this design eliminates the need for an optical disk, while providing smooth character-at-a-time response to the operator at the keyboard.

Users may choose from 14 character fonts—not only the standard 10 or 12 characters-per-inch, but also con-



densed and expanded characters. Fonts are selected through escape sequences or from the keyboard for both the 430 and 440 models.

Print speed is over 50 characters-per-second, providing 30 cps throughput at 10 cpi without fill characters. Communication speed is selectable over the range of 110 to 1200 baud. Data pacing is available for communications speeds of 450, 600 and 1200 baud.

For more information: Computer Transceiver Systems, P.O. Box 15, East 66 Midland Ave., Paramus, NJ 07652; (201) 261-6800.

FLOPPY DISK FOR IBM

The INSTOR/801 is a floppy disk system for the IBM Personal Computer using the IBM Diskette I Basic Data Exchange (3741) format. With the unit and IBM's Asynchronous Communications Adaptor card, the computer can read and write an 8-inch IBM 3741 format diskette. This diskette is then compatible with any computer that uses the IBM 3741 format.

The product was specifically designed to provide easy and economical compatibility for the IBM. It is priced at \$2000, and comes complete with interfacing software.

For more information: INSTOR Corp., 175 Jefferson Dr., Menlo Park, CA 94025 (415) 326-9830.

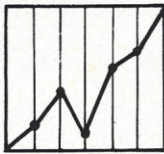
6 ways to give your TRS-80* a

+PLUS

Exhaustive research and professional standards
bring you the best in business software.

EASYTRAK™

KEEP YOUR SALES CURVING UPWARD WITH EASYTRAK™, a powerful, all-purpose activity tracking system. User-specified options enable you to monitor sales activity by territory, product line, salesman, or by combinations. Can monitor inquiries, sales calls and order booking. Production activity (by shift, by product, by day, by team, etc.), spending or income activity are simple to set up with EASYTRAK™. Extensive video displays make available individual, group or total summaries, relative averages, and percentage data all at the touch of a button. Use of an 80-column printer is optional.



MODEL III \$125
MODEL II \$150

New!

+ GENERAL LEDGER

SLICE OUT MORE PROFIT by using +General Ledger to monitor your financial status. Features include fully-flexible financial statements, both budget and last year comparisons, special report options, monthly and quarterly trial balances, manual and/or automatic journal entries all with extensive audit trails. You structure the chart of accounts with up to 5 digit account numbers.

MODEL III \$325
MODEL II \$350



+ ACCOUNTS RECEIVABLE

PUT MORE CASH IN YOUR BANK ACCOUNT with +Account Receivable's many collection/credit features, including average payment days, aging schedule and statements. Open-item system records sales activity this year and last, optional automatic discounts and salesman assignment. Cash receipts and A/R adjustments feature extensive on-line validation. And, yes, +Accounts Receivable handles the pesky new 9-digit zip code. Other optional features include service charges to selective customers; partial and "on-account" payments. Posts, at your option, to +General Ledger.

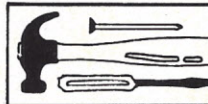


MODEL III \$325
MODEL II \$350

+ FIXED ASSETS

A POWERFUL SET OF TOOLS TO CALCULATE and monitor fixed asset expenditures, book and tax depreciation, investment tax credit, etc. Will even forecast future depreciation for you. (Handy at budget time!) Code structure enables you to classify assets by departments, buildings, groups or other categories. Handles seven depreciation methods. Can post to +General Ledger for you.

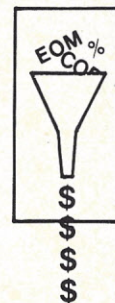
MODEL III \$325
MODEL II \$350



+ ACCOUNTS PAYABLE

FUNNEL THAT STACK OF BILLS into +Accounts Payable system and create an orderly, manageable flow of vendor histories, cash requirements forecasts, check registers and checks, aging schedules, etc. Will accept manual checks, reversals, and adjustments. Pay by selected vendor, invoice, due date, discount dates, and optionally post directly to your +General Ledger. Supports 5-digit vendor numbers.

MODEL III \$325
MODEL II \$350



+ PAYROLL

KEEP YOUR EMPLOYEES HAPPY and smiling with prompt, accurate and professional payroll records. Will handle weekly, biweekly, semimonthly, monthly payrolls, produce checks, check registers, labor reports, earnings reports, Form 941's, W2's, etc. Can handle fixed/voluntary deductions, hourly/salary employees, bonuses, city and state taxes, etc. Easy to use and update tax tables. Automatic +General Ledger posting.

MODEL III \$325
MODEL II \$350



SPECIAL! All of the above: MODEL III \$1600
MODEL II \$1750

+PLUS SOFTWARE comes to you feature-packed from on-line validation to machine-language file handling. Extensive documentation and thorough installation guide accompany each order. All systems are furnished on disk. Source code is included.

Dealer inquiries invited

*TRS-80 is a registered trademark of Tandy Corp.
EASYTRAK is a trademark of Plus Computer Tech, Inc.



To order, call TOLL-FREE
1-800-323-4240

+PLUS

PLUS COMPUTER TECHNOLOGY, INC.
6900 N. AUSTIN AVENUE
CHICAGO, IL 60648 (312) 647-0988
CIRCLE 39



48K — w/disk

CRYSTALWARE

THE FINEST IN
FANTASY GAME SOFTWARE



48 — w/disk



48K — w/disk

At Crystal we are doing our best to provide the finest state-of-the-art graphic adventure software in the world. Our list of credits include the first indoor-outdoor graphic adventure, the first multi-disk graphic adventure, and now for the Atari, the first graphic adventure in the world which includes screen scrolling and animation. The era of the text adventure and games which are simple combinations of static graphics and text is rapidly drawing to a close. We attempt to utilize the full potential of your computer. True, many of our games use up to 48K and we only deal in disk products, but there are a lot of users out there who have worked hard to upgrade their systems to the max and we think they deserve games that will give their computer system a run for its money.

FANTASYLAND \$59.95 "IMAGINE"

Congoland—In the deep heart of Africa at the turn of the 19th century; supply yourself at the village and lead a group of explorers into the treacherous jungle to find the lost mines of King Solomon.

Arabian Adventure—Embark for Cathay from ancient Baghdad. You are the leader of a caravan and must overcome the perils of the desert and . . .

King Arthur—You are Sir Lancelot in the days of King Arthur. You have been called to find and rescue Guinevere from an evil sorcerer who has stolen her away. You must buy armor and supplies and find the bottomless cave in the Emerald Mountain.

Olympus—Prepare to embark on a great sea odyssey as the captain of the Argos. With a group of brave warriors you seek the golden fleece.

Captain Nemo—You lead an expedition to find the lost city of Atlantis. You are the captain of a new experimental diving apparatus . . . with a few bugs to be checked out.

Dante's Inferno—You stand at the gate of Hades. A wise old magus approaches you and offers help and advice. He spreads out 8 tarot cards and warns of hideous demons and bottomless pits . . . Dante's Inferno awaits you!

TREASURE ISLAND \$39.95 You must navigate the treacherous seas using an old treasure map and seek out which island the pirates have buried their treasure on. There are over 21 islands and 128 hires screens. This is not a screen scrolling game but also uses static graphics and understands more than 100 input commands.

BERMUDA EXPERIENCE \$39.95 Off the coast of Florida near the Carribean the icy blue waters of the Atlantic are particularly menacing. It is within this area that many aircraft and ships have mysteriously disappeared, never to be heard from again! Some credit these phenomena to tricky currents, strange weather changes, and even to unexplainable magnetic fields which change with little or no warning. Many fishing boats have been found floating in undisturbed waters, half eaten food, unfinished beers, and no evidence of struggle—totally deserted. In this action-packed game, we try to capture some of the flavor of this mysterious area. It features our scrolling techniques and some fine hires graphics and sound.

HAUNTED PALACE \$49.95 There has been a murder. It all started with the grisly discovery of a charred body in the furnace. The corpse was so badly burned that the mortician couldn't even tell which sex it was. You can choose to become any one of the six characters in this game. Your role is to find out who is responsible for the murder. There are over 640 views in the mansion. All views are in 3-D perspective and movement is controlled by joystick in the Atari 800. There is a \$500 prize for the first to solve the mystery!



CRYSTALWARE

Having previewed over fifty of your competitors' games, I can assure you that your use of scrolling far exceeds anything I've seen for the Atari and, of course, for the Apple. I'm very impressed by the dedication and quality that your company exhibits by virtue of this demo." **David Sosna** — Associate Producer, Universal Pictures

ZARDON \$49.95 In the far reaches of space is an asteroid called Zardon. It is held by a fierce race of Cybords—highly sophisticated androids. This space rock is honeycombed with countless caves. In the center is the rare Simian Jewel from the place of the Meshim on Mars. The passage ways are guarded by banks of laser gunners, scramble fields, high energy voeres. To win, you must safely navigate your vessel to the center of Zardon and figure out to get the jewel.

THUMPER \$39.95 This little rabbit is stranded 10 miles from his burrow and must cross several roads, a treacherous stream, avoid lethal traps, and avoid the wily fix to find his way home. Features vertical scrolling and a 4-way sound.

WATERLOO \$49.95 This is a two-player game with your opponent commanding the opposition and you taking the part of Napoleon. As you approach this final battle, you are equipped with the same forces, face the same enemies, and survey the same terrain as Napoleon did. The game includes a high resolution scrolling map.

CLONUS II \$39.95 You wander into a city of the future in the year 2086. You have no money or belongings, but you have the task of somehow manufacturing a clone of yourself. You may sell any parts of your body except for your head and you may gamble in one of the craziest casinos you will ever encounter in this lifetime. The object is to build a clone but the city is more extensive.

Crystalware has many other fine fantasy and space games. For a copy of **CRYSTAL VISION**, which includes complete catalog, please send \$3.00 to the address below.

Our order lines are open 24 hours a day, 7 days a week.

CRYSTALWARE, INC.

(408) 778-2966 • 17120 Monterey Street • Morgan Hill, CA 95037

Dealers outside California call (800) 538-2155 toll free

CIRCLE 40

HARDWARE OF THE MONTH

HARDWARE INDEX A COMPREHENSIVE LISTING OF NEW PRODUCTS

SYSTEMS

PRODUCTS/FEATURES/PRICE

COMPANY/AVAILABILITY

UNDER \$1000

Model PC-2 Pocket Computer
advanced programming and
communications features
\$300

Radio Shack
Fort Worth, TX 76102
retail
CIRCLE 225

UNDER \$7500

Fortune 32:16
expands to system for small to
medium-sized business
\$4995

Fortune Systems
San Carlos, CA 94070
retail
CIRCLE 226

FX-9000P
compactness, speed and
attainable efficiency
\$1199

Casio
Fairfield, NJ 07006
retail
CIRCLE 227

HP-87
integrated 80-column
text and graphics display
starting at \$2495

Hewlett-Packard
Palo Alto, CA 94304
retail
see story on page 83
CIRCLE 228

PC-8000 Series
data and word processing
capabilities
starting at \$2849

NEC Home Electronics USA
Elk Grove Village, IL 60007
retail
CIRCLE 230

TRS-80 Model 16
16-bit technology and multi-
user operating system
starting at \$4999

Radio Shack
Fort Worth, TX 76102
retail
CIRCLE 231

MASS STORAGE

HARD DISK DRIVES

Apple III Mass Storage System
both 5 $\frac{1}{4}$ -inch and 8-inch
Winchester disks
for Apple III
starting at \$3750

Corvus Systems
San Jose, CA 95131
retail
see story on page 89
CIRCLE 232

micro lab presents a

TAXSAVER



New Tax Laws have you bent out of shape?



Get straightened out fast with the ASSET-MANAGER.

The new tax laws change the way individuals, companies, and partnerships depreciate assets. In some cases you should file using the old methods; in others, the new law applies; you may require a combination of the old and new laws; or you may even have to refile.

The Asset-Manager takes the confusion out of the laws. It took two college professors to untangle the mess for you. Because the authors of

this remarkably easy program are also teaching, they know how to simplify the problems you will encounter. Just enter your assets and the program selects the correct methods of depreciation, prints the schedules for your taxes, and even produces reports for your financial statement. It uses the accelerated method for your taxes and the straight line method for your financial statement. All this and year-round asset management too.

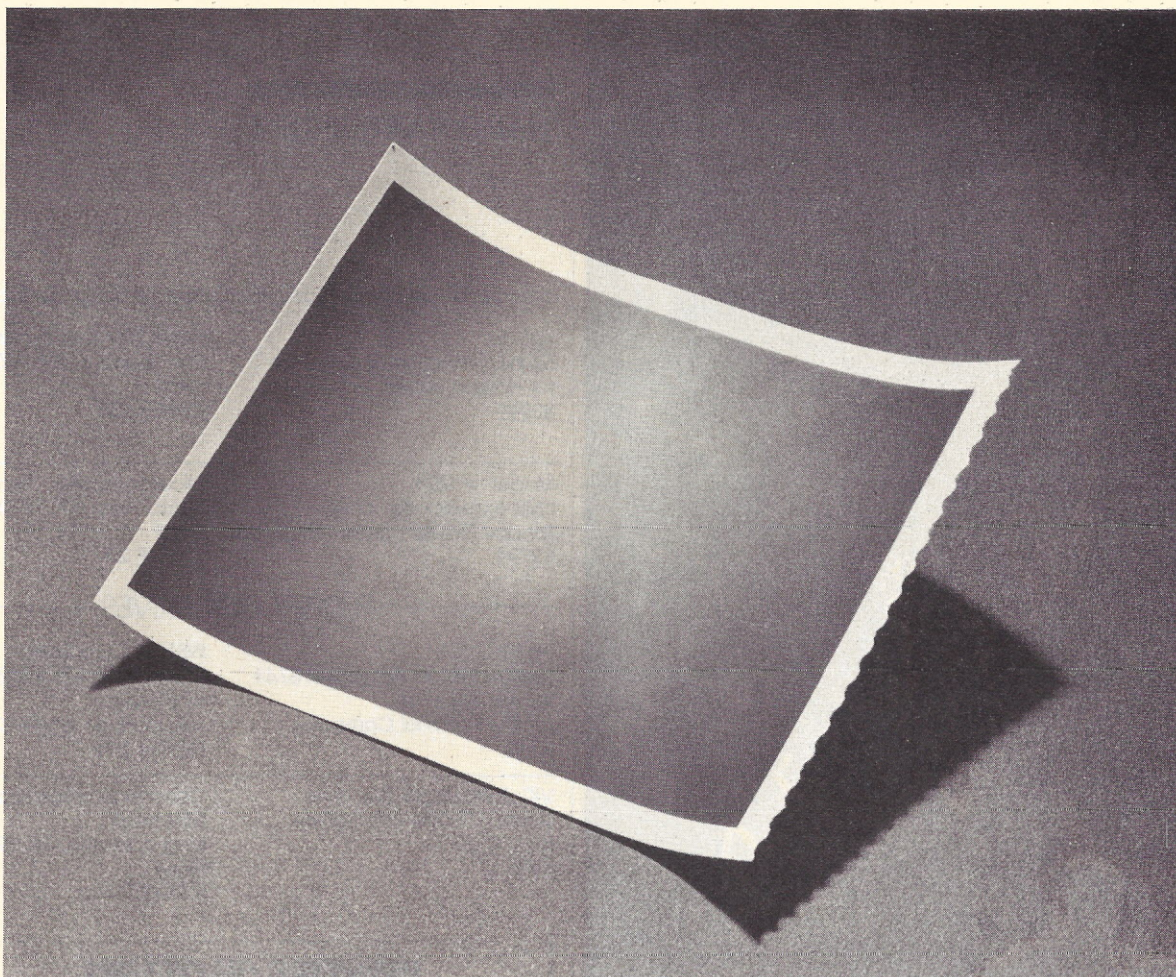
Available at your Apple dealer at the introductory price of \$200.

© 1981, Micro Lab, Inc.

Apple is a trademark of Apple Computers, Inc.

micro lab
systems that work

2310 Skokie Valley Road
Highland Park, IL 60035 • 312-433-7550



This is a picture
of all the printers in the world
that outsell the MX-80.

Epson.

The one thing you can't beat in the marketplace is value. And there simply isn't a better combination of reliability, print quality, features and price in an 80-column printer than the Epson MX-80. Anywhere on earth.

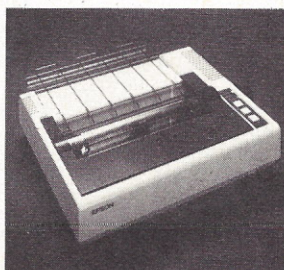
But while we're pleased to make the best-selling 80-column printer in the world, we're hardly surprised. Because we decided a long time ago that the way to succeed in this business is to build a good product, sell it at a fair price, and stand behind it.

So we built our MX-80 with features like a choice of 24 different type faces, graphics that rival plotters, logical seeking, bidirectional printing and the world's first disposable print head. We priced it at under \$650. And if it breaks, we'll be here to fix it.

That seems like a straightforward enough policy. But when we first introduced the MX-80, the competition

laughed. Now they're cutting prices, introducing "new" models, and running splashy color ads, all in an effort to catch up. And they're not laughing.

But you don't have to take our word for it. You've got a choice: you can buy the printer that's been embraced by several hundred thousand computer fanatics all over the world. Or you can buy something else. And take your chances.



EPSON
EPSON AMERICA, INC.

3415 Kashiwa Street, Torrance, CA 90505 • (213) 539-9140

CIRCLE 12

April 1982 PERSONAL COMPUTING 97



HAVE YOU READ PEELINGS II ?

Entering its third year, *Peelings II* is widely respected in its field. It is a special magazine which evaluates Apple II software. We review all kinds of software, from cover to cover.

Our reviews are sometimes humorous, occasionally blistering, but always honest, informative and to the point.

Subscribe Now. Our promise is the Truth, nine times a year. You can't go wrong. (Money-back guarantee, of course.)

PEELINGS II
Dept. P
P.O. Box 188
Las Cruces, N.M. 88004
(505) 526-8364

One year (9 issues)
\$21.00/U.S.—\$28.50/Canada, Mexico
\$44.00/Foreign

CIRCLE 36

HARDWARE INDEX

HDS-5
5 $\frac{1}{4}$ -inch Winchester disk drive
for Horizon Series
\$2999

North Star Computers
San Leandro, CA 94577
retail
CIRCLE 233

Model #1421
5MB external disk drive
for any TRS-80 computer system
\$2799

Microcomputer Technology
Santa Ana, CA 92704
retail
CIRCLE 234

FLOPPY DISK DRIVES

INSTOR/801
read/write an 8-inch IBM 3741
format diskette
for IBM Personal Computer
\$200

INSTOR Corporation
Menlo Park, CA 94025
mail order
see story on page 92
CIRCLE 235

VIC 1540 single disk drive
stores 170,000 characters
for VIC 20
\$595

Commodore Business
Machines
King of Prussia, PA 19406
retail
CIRCLE 236

PRINTERS/PLOTTERS

UNDER \$1500

EXECUPORT Series
portable impact printers
\$995, \$1195, \$795

Computer Transceiver
Systems
Paramus, NJ 07652
retail
see story on page 92
CIRCLE 238

PC-8023A
dot matrix printer
\$795

NEC Home Electronics USA
Elk Grove Village, IL 60007
retail
CIRCLE 239

OVER \$1500

HP-7470
two-pen graphics plotter
for HP Series 80 and 125, Apple,
IBM, Commodore
\$1550

Hewlett-Packard
Palo Alto, CA 94304
retail
see story on page 89
CIRCLE 240

TERMINALS/MONITORS

UNDER \$1000

Alpha Star
general purpose CRT
\$465

Emulog Inc.
Fremont, CA 94538
mail order
CIRCLE 241

Color II
80 x 24 character display
for IBM Personal Computer
\$999

Amdek Corporation
Arlington Heights, IL 60005
retail
see story on page 90
CIRCLE 242

Before you buy any printer, give it this test.

Other IMP-4

GREAT GRAPHICS

[?]

[2]

Only IMP-4 gives you bi-directional printing of dot addressable graphics at no extra cost. And with our Quad Density feature, you can even print 19008 dots per square inch! That's more than twice the resolution of Epson's finest!

SIMPLE PLUG-IN

[?]

[2]

Apple, TRS-80, PET, Atari, HP... you name it. We've got the industry's widest range of interfaces ready to plug into your computer.

3-WAY PAPER HANDLING

[?]

[2]

Axiom's IMP-4 lets you use single sheets, roll paper, or continuous tractor-fed forms. On other printers these features are probably expensive options, if available at all.

LIFETIME 9-WIRE PRINT HEAD

[?]

[2]

Axiom's rugged head prints good looking tightly formed characters with lower-case descenders, 6 different character sizes and boldfaces too, all printed bi-directionally at up to 100 cps!

MODERN STYLING

[?]

[2]

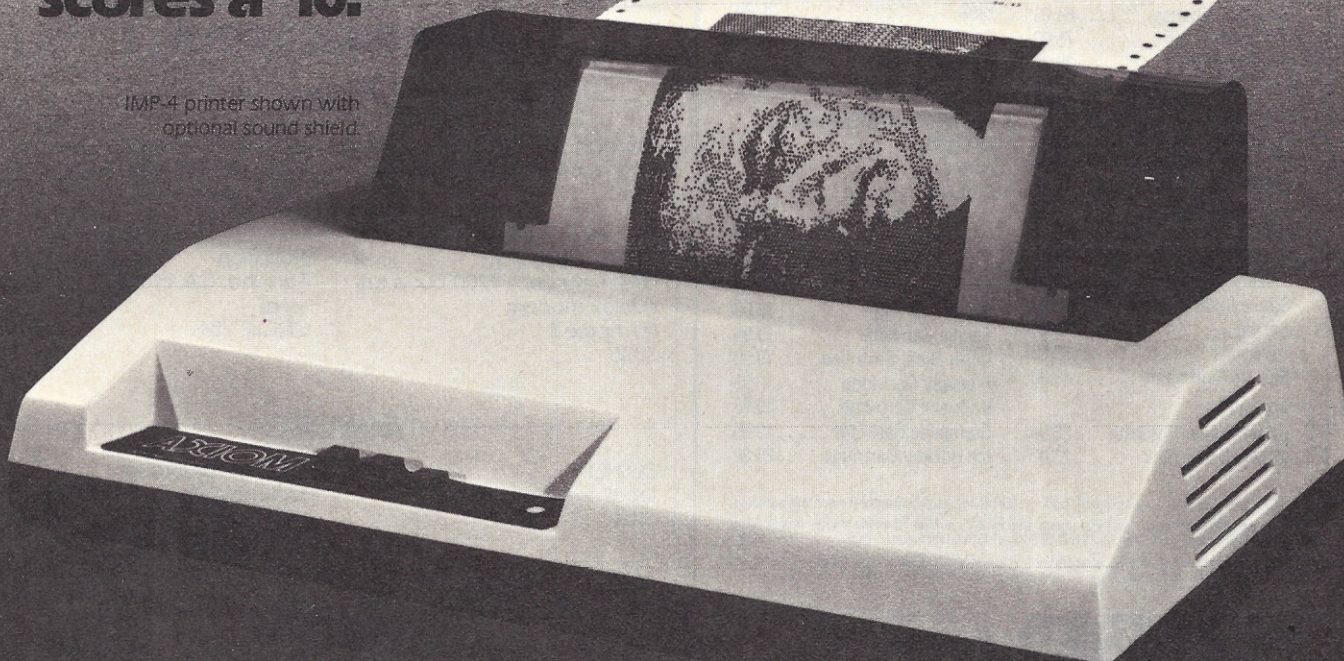
Styling isn't the main reason you choose a printer, but isn't it nice to know you're getting a printer that will also look great in your office or home?

Score 2 points for each answer.

10

AXIOM's new IMP-4 scores a "10."

IMP-4 printer shown with optional sound shield.



AXIOM

AXIOM CORPORATION

1014 Griswold Avenue, San Fernando, CA 91340 • Telephone: (213) 365-9521 • TWX: 910-496-1746

CIRCLE 109

The Hard & Soft of It: Atari from ASAP

If you're into Atari, get into ASAP. When it comes to Atari, ASAP has it all — computers, a full line of accessories, and one of the most complete lines of software on the market. Whether you use your Atari for work or play, make ASAP your source.

The Atari® 800™ Computer features color graphics and English characters with truly high resolution, high quality sound, expandable memory and sleek modular appearance.

Atari® 400™ — 16K also available: \$349.00.

OPTIONAL ACCESSORIES	PRICE
ATARI® 410™ Program Recorder	80.00
ATARI® 810™ Disk Drive	Call for price
ATARI® 822™ Thermal Printer	299.00
ATARI® 820™ 40-column Dot Matrix Impact Printer ...	279.00
ATARI® 825™ 80-column Dot Matrix Impact Printer ...	625.00
ATARI® 830™ Acoustic Modem	159.00
ATARI® 850™ Interface Module	169.00
ATARI® Paddle (CX30-04) and Joystick (CX40-04)	17.95
ASAP 16K RAM Module	55.00

COMPLETE SOFTWARE LIBRARY INCLUDES THESE POPULAR UNITS:

Atari®	
Educational System ROM	19.95
Video Easel ROM	25.00
Music Composer ROM	42.00
Assembler/Editor ROM	45.00
Mortgage Loan Analysis	
Tape	12.95
Stock Analysis Disk	19.95
Stock Charting	19.95
Bond Analysis Disk	19.95
Mailing List Tape	19.95
Touch Typing (2 tapes)	19.95
Graph It (2 tapes)	17.95
Word Processor	119.00
Personal Finance	64.95
Microsoft Basic	75.00
Basketball ROM	30.00
Super Breakout ROM	30.00
Computer Chess ROM	32.00
3D Tic Tac Toe ROM	25.00
Star Raiders ROM	36.00
Kingdom Cassette	12.95
Blackjack Cassette	12.95
Biorhythm Cassette	12.95
Engergy Czar Tape	12.95
Telelink (Terminal ROM)	24.00
Space Invader (ROM)	30.00
Scram	16.95
Asteriods	32.00
Missile Command	32.00

Arcade Plus

Ghost Hunter Cassette	25.00
Ghost Hunter Disk	25.00

Datasoft

Atari Mailing List Disk	19.95
Atari Character Generator	
Disk	16.95
Text Wizard Disk	89.95
Micropainter Album 1	
Disk	16.95
Micropainter Album 2	
Disk	16.95
Le Stick Accs	30.00

On-Line Systems

HI-RES Adv #0 — Mission:	
Asteroid Disk	19.95
HI-RES Adv #2 — Wiz & Princess	
Disk	25.00
Roadwork Disk	29.95
Jawbreaker Disk	25.00
Softporn Adventure (X-rated)	
Disk	25.00
The Next Step Disk	29.95

Personal Software

Visicalc Disk	169.00
---------------	--------

FOR HOME ENTERTAINMENT SYSTEMS:

Activision

Dragster Cartridge	19.95
Boxing Cartridge	19.95
Checkers Cartridge	19.95
Fishing Derby Cartridge	19.95
Skiing Cartridge	19.95
Bridge Cartridge	25.00
Tennis Cartridge	19.95
Laser Blast Cartridge	19.95
Freeway Cartridge	19.95
Kaboom! Cartridge	19.95
Stampede Cartridge	19.95
Ice Hockey Cartridge	25.00

ASAP offers a 30-day buyer protection policy: full money-back guarantee if not totally satisfied.
Ordering information: name, address, phone; ship by: UPS or Mail. Shipping charge: add \$2.50 up to 1 lb. (UPS blue), U.S. Mail add \$1.50 (U.S. only) (\$25.00 minimum order).
Terms: We accept cash, check, money orders, Visa and Master Charge (U.S. funds only). Tax: 6% Calif. res., COD's and terms available on approval (School PO's Accepted).

asap
computer
products, inc.

Toll free outside California:

(800) 421-7701

Inside California:

(213) 595-6431

(714) 891-2663

1198 E. Willow St., Signal Hill, CA 90806

HARDWARE INDEX

OVER \$1000

VISUAL 300
microprocessor-based video-
display terminal
\$1150

Visual Technology
Tewksbury, MA 01876
mail order
CIRCLE 243

BOARDS

MEMORY

128k Bank Selectable Dynamic
Memory
8 independent 16k byte banks
for Alpha Micro, Cromemco,
Dynabyte, North Star
starting at \$1595

Systems Group
Orange, CA
mail order
CIRCLE 244

SPECIAL PURPOSE

ADA 8/4 AP
analog I/O board
for Apple II
\$250

International Aerospace
Products
White Marsh, VA 23183
retail
CIRCLE 246

PDA232C
connects to modems, printers,
CRT terminals
for Apple II
\$199

Pure Data Ltd.
Markham, Ontario, CANADA
retail
CIRCLE 247

COMMUNICATIONS

MODEMS

MT212A
dual-speed 1200 and 300 bps
\$850

Multi-Tech Systems
New Brighton, MN 55112
mail order
CIRCLE 249

212 Apple-Cat II
direct connect 1200 baud full-
duplex modem
for Apple II
\$725

Novation
Tarzana, CA 91356
retail
CIRCLE 251

NETWORKS

DESNET
local-area networking
\$2295

The DESTEK Group
Mountain View, CA 94043
mail order
see story on page 90
CIRCLE 252

FURNITURE

Model 5000/D Computer
Console
portable cabinet to house
components
for most personal computers
\$695

Micro Solutions
Los Angeles, CA 90045
mail order
see story on page 92
CIRCLE 253

Sams offers five books designed to help you explore the basic workings of your Apple microcomputer. Here you'll find all of the information necessary to understand and use the limitless computing power of the Apple system. With these great books from Sams, your venture into the world of the Apple microcomputer will be a fruitful one!

APPLESOFT LANGUAGE Beginning programmers are given a comprehensive, step-by-step introduction to Applesoft, the language of the Apple II microcomputer. No. 21811. \$10.95

INTIMATE INSTRUCTIONS IN INTEGER BASIC This complete introductory overview of Integer BASIC enables even the most nontechnical reader to write and use simple programs. No. 21812. \$7.95

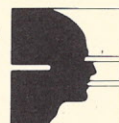
6502 SOFTWARE DESIGN The 6502 microprocessor is the heart of your Apple microcomputer. 6502 Software Design introduces you to programming in 6502 assembly language allowing you to perform high-speed processing and peripheral control not generally possible with higher-language programs. No. 21656. \$12.95

MOSTLY BASIC: APPLICATIONS FOR YOUR APPLE® II Twenty-eight BASIC language programs for your Apple II microcomputer are thoroughly outlined and discussed. These programs are useful in all facets of the home and business. No. 21789. \$12.95

APPLE® INTERFACING You are provided with real, tested circuits which interface to your Apple microcomputer for remote control, data acquisition, and control of external electronic and electromechanical devices. No. 21862. \$10.95

Each book presents a different slice of the intricate workings of your Apple microcomputer. To take full advantage of this powerful machine, you must understand it from the inside out.

To order these Sams Books or to get the name of your local Sams retailer, call 800-428-3696 toll-free, or 317-298-5566 and reference AD170.



SAMS BOOKS

Howard W. Sams & Co., Inc.
4300 West 62nd Street, P.O. Box 7092
Indianapolis, IN 46206

GET TO THE CORE OF YOUR APPLE®



Offer good in USA only and expires 7/31/82. Prices subject to change without notice.

CIRCLE 52

April 1982 PERSONAL COMPUTING 101

Something For Everyone: Spreadsheets, Budgeting, Education, Programming Aids

BUDGETING AND BOOKKEEPING FOR BUSINESS

The Budget Planner is a tool for modeling and developing company budgets and forecasts. It is designed for business firms and accountants.

The software provides five methods for entering and modeling data: individual monthly entries, straight line, annulized, percent of increase or decrease, and percent of other budget features. Reports include: detail budget model, and quarterly and summary budget models.

The price is \$150.

The Business Bookkeeping System is a cash accounting system for small-business firms, and a client accounting system for accountants.

The package consists of four modules: general ledger; and customer, vendor and employee activity. Reports include: month-to-date customer-activity register, aged-receivables register, revenue analysis, month-to-date disbursement register, expense analysis, quarterly and year-to-date withholding register, detail and summary trial balance, balance sheet and income statements, and chart of accounts.

The price is \$395.

For more information: Dakin5, P.O. Box 21187, Denver, CO 80221; (800) 525-0463.

NEW SPREADSHEET DIMENSION

Report Manager creates and instantly updates a complete variety of reports for financial, accounting, engineering and scientific applications. The program also has an unprecedented third dimension—the ability to calculate.

The program is CP/M based and is being marketed with NEC's PC-8000 series microcomputer system. It generates business reports such as income statements,

balance sheets and sales forecasts. In addition, the software can produce bar charts, a feature not present in other electronic spreadsheets, and reports may be created from any plane in the X, Y and Z-axes "data cube" generated by the program.

Another distinct feature of Report Manager is its dynamic editing capability. Any change in any part of the report forces a recalculation of the entire document. Reports can be instantly updated with the simple entry of new data. This feature makes the program suitable for forecasting financial trends and conditions. Financial projections, percentage increases and other considerations can also be illustrated using a single number of formula variation.

Report Manager stores all frequently referenced statements and reports, and creates new ones by updating numbers and altering the text. The original data disk includes sample reports that may be formatted to meet individual requirements.

The price is \$200.

For more information: NEC Home Electronics USA, 1401 Estes Ave., Elk Grove Village, IL 60007; (312) 228-5900.

FROM ONE APPLE TO ANOTHER

The Transend series of data-communications software for the Apple II is compatible with a wide range of add-in boards, as well as the most popular modems. And with the ability to use a 1200 baud rate, Transend is one of the fastest data-communications software packages available for the Apple II, the company says.

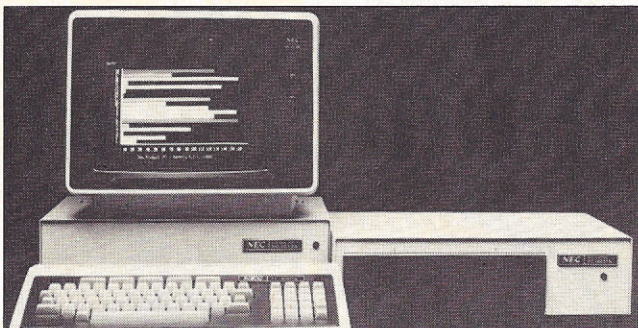
Transend I permits Apple-to-Apple communications, as well as Apple-to-mainframe or Apple-to-information utilities (such as The Source), and allows the user to send and receive messages and data files using a modem and a phone line.

Transend 2 performs the same functions as Transend I, but has a larger file-handling capacity, and can detect errors in transmission. If an error is detected, Transend 2 automatically retransmits the data for verification.

Transend 3 combines all of these features, but adds electronic-mail capabilities, making the Apple a total communications machine.

The prices for Transend 1, 2 and 3 are \$89, \$149 and \$275 respectively. Two disks come with each package.

For more information: SSM Microcomputer Products, 2190 Paragon Dr., San Jose, CA 95131; (408) 946-7400.



DISK PRICE BREAKTHROUGH

Buy direct from the manufacturer and save on high-performance disk systems for Apple II.

There's probably nothing that would add more power and usefulness to your Apple than a bigger, faster disk.

Now Lobo Drives offers a whole family of disk upgrade options—direct from the manufacturer, at substantial savings.

We cut out the middleman—not the quality.

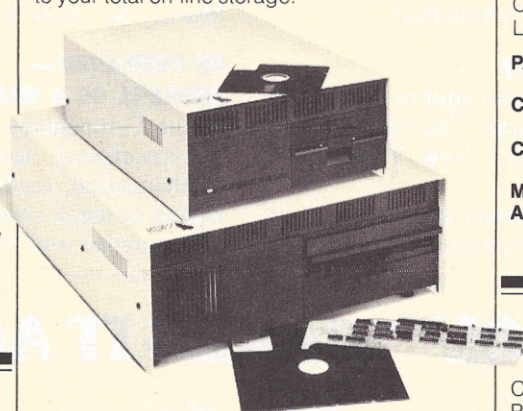
Make no mistake—Lobo's low prices are for highest quality, ultra-reliable systems. We take no shortcuts in design, manufacturing, testing, and burn-in. That's why Lobo systems are probably the only ones you'll find anywhere with a 1-year parts and labor guarantee.

Lobo uses only Shugart or Seagate drives—the standards of the industry. We put them in rugged metal cabinets, with heavy-duty fan-cooled power supplies and our own proven controllers and interfaces.

So whether you want 8" floppies, a Winchester system, or just a less expensive Apple-equivalent disk, Lobo delivers top quality for less.

You'll find our disk price breakthrough can mean a real performance breakthrough for your Apple II!

IMPORTANT: many hard disk systems now being sold have no provision for backing up the disk (using standard Apple minifloppies, you'd need about three dozen diskettes to completely back up a 5 MB drive!). *Lobo hard disk systems come with a built-in double-sided, quad-density floppy drive that can store the complete contents of the hard disk on six or seven floppies.* This floppy drive also adds the equivalent of at least 5 more Apple disk drives to your total on-line storage!



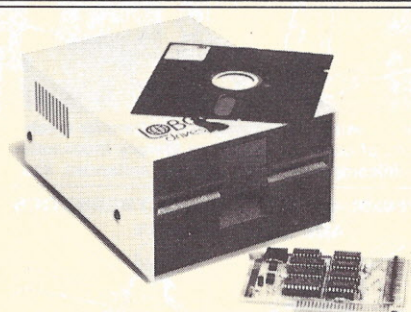
5 1/4" SYSTEM: ONE 5MB HARD DISK PLUS ONE 737 kB FLOPPY

Model 950A **\$3633.00**

8" SYSTEM: ONE 8 MB HARD DISK PLUS ONE 1.2 MB FLOPPY

Model 1850A **\$4459.00**

Both include Lobo DMA interface usable in Apple slot 1-7 and DOS 3.3 patches. CP/M optional (see below).



Apple-Compatible Minifloppy Systems

Both the disk drive and the interface card are functionally identical and plug-compatible with Apple Disk II equipment. Lobo and Apple drives may be freely mixed on a Lobo or Apple interface card, and the Lobo interface features a switch to select 13 or 16 sector boot. The only other difference is the price and Lobo's unique 1-year guarantee!

DISK DRIVE WITH INTERFACE CARD

Model 3101-I **\$455.00**

DISK DRIVE ONLY

Model 3101 **\$385.00**

Software and Accessories

All Lobo disk systems come complete with interface card and any necessary patches to DOS 3.3. Use of Apple Pascal with Lobo 8" floppy drives requires the Lobo Pascal Creator disk and documentation.

Running CP/M with Lobo Winchester or 8" floppy systems requires a Microsoft SoftCard, an Apple Language card (or Microsoft RAM Card or equivalent), and the Lobo CP/M disk. Pascal is not currently supported on Lobo Winchester systems.

PASCAL CREATOR DISK AND DOCUMENTATION	\$54.00
CP/M DISK AND DOCUMENTATION	\$54.00
CP/M DISK WITH MICROSOFT SOFTCARD	\$355.00
MICROSOFT 16K RAMCARD	\$175.00
APPLE FAN (RECOMMENDED FOR HEAVILY LOADED SYSTEMS) CLIPS ON LEFT SIDE OF COMPUTER	\$72.00

Ordering Information

All prices include shipping and handling. California residents add 6% sales tax. Credit card orders shipped within 24 hours. Personal checks require 2-3 weeks for clearance before shipment. Please allow up to 6 weeks for delivery.

The Lobo Warranty

All Lobo hardware products carry a limited 1-year parts and labor warranty. Call or write for complete warranty statement.

© 1982 Lobo Drives International
CP/M is a trademark of Digital Research Corp.
SoftCard is a trademark of Microsoft.
Apple II is a trademark of Apple Computer, Inc.



TOLL-FREE ORDER NUMBERS:

U.S. (except California);

800-233-1245

In California: **800-322-6103 or 800-322-6104**

Hours: 7AM—5PM Pacific Time

Write for free catalog:

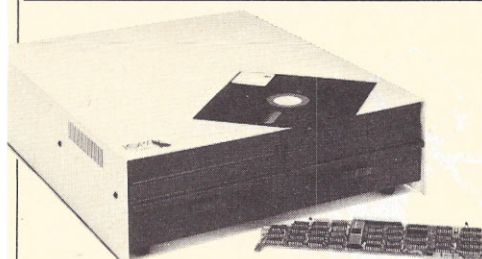


INTERNATIONAL

LOBO DRIVES INTERNATIONAL

Dept. PC4

358 S. Fairview Ave.
Goleta, CA 93117



8" Floppy Disk Systems

Up to 2.2 megabytes of on-line storage with two double-sided, double-density 8" floppies (1.1 megabytes with single-sided drives). DOS 3.3 capabilities are supported. Interface plugs into any Apple I/O slot (except 0).

Lobo's optional CP/M includes a special DENSITY command to permit reading and writing standard single-density disks.

Optional Pascal software lets you store the entire Apple Pascal system on one side of one 8" disk—with lots of room left for program files.

TWO SINGLE-SIDED DRIVES

Model 8202CA **\$1625.00**

TWO DOUBLE-SIDED DRIVES

Model 5202CA **\$2025.00**

Winchester Disk Systems

Programs that make heavy use of disk files will get a spectacular performance boost when you plug in up to 8 megabytes of ultra-fast hard disk storage. And imagine the convenience of having all your program and data files immediately available whenever you boot the system.

SOFTWARE OF THE MONTH

LEARN TO TYPE

Hi-Res MasterType builds touch-typing drills into an addictive space-war-game format. The colorful typing instruction game is available for 48k Apple II disk systems.

Seventeen progressive lessons provide a continuous challenge as the player develops mastery of the entire keyboard. Early lessons teach the basic key locations. Players then progress at their own rates as they learn to use key combinations, punctuation keys and numerals.

The price is \$39.95.

For more information: Lightning Software, P.O. Box 11725, Palo Alto, CA 94306; (415) 856-1855.

WHAT MAKES THE APPLE TICK?

Computicker allows the Apple computer to function as a real time ticker-tape machine. The user receives data from a direct feed from the New York Stock Exchange's Network "A" tape.

Computicker consists of an electronic-communications board and a set of sophisticated software programs. The

user has full command over the screen display and over versatile commands that control the format and content of the ticker display.

The program provides a continual display of stock information throughout the market day. There is no extra charge for operating it the full-market day, five days a week.

Computicker uses a dedicated line supplied by Western Union. There is a fixed monthly fee paid directly to the New York Stock Exchange (about \$150). Computicker costs \$90.

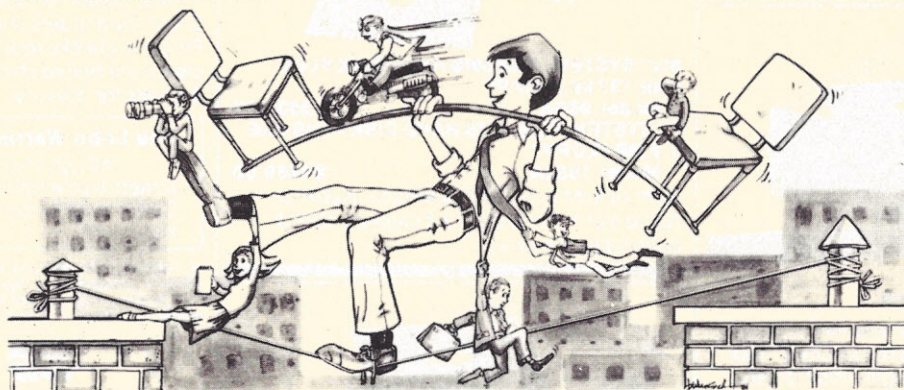
For more information: Wall Street Software, 71 Murray St., New York, NY 10005; (800) 221-2486.

BE PREPARED—

THERE'LL BE A QUIZ

The Competency Exam Preparation Series provides a structured, sequential curriculum encompassing mathematical, reading and writing instruction. It is designed to teach concepts and operations, to provide drill and practice and to access achievement levels through

RM/COBOL^{TM1} MAKES IT ACROSS!



...FROM ONE OPERATING SYSTEM TO ANOTHER!

A VITAL WAY TO PROTECT YOUR SOFTWARE INVESTMENT FOR THE FUTURE!!

The **RM/COBOL** language runs on more different Operating Systems and more different-sized computers than any other similar language. For starters, it runs on NCR and TI minicomputers and, in the micro field, on the CP/M², MP/M³, CP/M-86⁴, MP/M-86⁴, TRSDOS⁵, OASIS⁶, MOASIS⁶, and UNIX⁶. (ONYX version) Operating Systems ... to mention only a few.

Until now, serious business software of the scope and flexibility seen in the minicomputer world has not been available on micros. **RM/COBOL** now allows transfer of such software with a minimum of fuss.

We have participated in such a mini-to-micro transfer of a major set of general business soft-

ware ... using **RM/COBOL** as the transfer mechanism, of course. Running on literally thousands of minicomputers, these refined, enhanced, and

RM/COBOL and **RT!**^{TM6} from **CYBERNETICS** ARE GOING STEADY...



...AND YOU'RE GONNA LOVE 'EM TOO!!

Use your computer to program itself. **RT!** (Cobol Reprogramming Tool!) from cybernetics is a program generator for **RM/COBOL** that produces error-free **RM/COBOL** source programs for data input, file maintenance, and report printing programs.

A full feature interactive program generator, not a subset! Call Now! 714/848-1922.

proven software packages cover A/R, A/P, G/L, P/R. Order Entry (with Invoicing and Inventory Control) as well as Sales Analysis. The Packages define a new level of achievement for features and flexibility in micro applications software and offer top quality at a reasonable price.

For immediate information, call 714/848-1922 for your complete product description.

Trademarks of:

1-Ryan—McFarland Corp.; 2-Digital Research, Inc.; 3-Tandy Corp.; 4-Phase One Systems, Inc.; 5-Bell Telephone Laboratories, Inc.; 6-Cybernetics, Inc.



8041 NEWMAN AVE., SUITE 208
HUNTINGTON BEACH, CA 92647
714/848-1922



There's an easier way to tame the Data Monster.™

Keeping track of information can be a beastly chore. But with **DataFax™** from Link Systems, you're always in control.

Unlike most conventional "data manager" software, DataFax doesn't care what your data looks like. Or how long it is, how many items it has or what you want to do with it.

The power we've programmed into DataFax makes it as easy and natural to use as a pencil and paper. You can fill up a screen any way you want with most anything you

want—even data already stored on disk. And then cross-reference it as many different ways as you'd like—by a date, a species, a customer's name, whatever.

So when you need that information, DataFax will retrieve it in a way that's meaningful to you. The powerful keyword function allows you to get infor-

mation out as quickly and easily as you entered it. And DataFax is the only software of its kind to let you expand from floppy to hard disks, so it'll never be obsolete.

If getting so much power with so little effort seems too good to be true, see your computer dealer and prove it to yourself—before your data situation gets any hairier.

Because whether you've got a monster of a data problem—or just a small one—DataFax can tame it.

LINK SYSTEMS

Simply powerful software™

Link Systems. 1640 19th Street, Santa Monica, CA 90404 (213) 453-1851 ©1981 Link Systems

CIRCLE 113

April 1982 PERSONAL COMPUTING 105

SOFTWARE OF THE MONTH

pre- and post testing.

The C.E.P.S. is designed for use by individual students or use in a classroom setting. Programs provide optional printer capability including worksheet generation and performance monitoring.

The series is available in three software formats: National Proficiency Series, California Proficiency Assessment Test Preparation Series, and N.Y. State Regents Competency Test Preparation Series. Each series costs \$2499. Separate mathematical and verbal packages are \$1499 each. A spanish language version of the mathematical instruction is available at no extra charge.

The series runs on Apple, Pet and TRS-80 personal computers with 16k, and is available on disk or cassette.

For more information: Krell Software, 21 Millbrook Dr., Stony Brook, NY 11790; (516) 751-5139.

SEVEN SURE-FIRE WAYS TO BEAT BOREDOM

Jupiter Lander, VIC Avenger, Superslot, Draw Poker, Super Alien, Midnight Drive and Magic Mouse cartridges offer graphics, sound effects and exciting play action for VIC 20 home-computer users.

Jupiter Lander presents the challenge of landing a space craft in one of the game's many caverns. Outer space is also the subject of VIC Avenger, featuring flying saucers, aliens and space cannons. Superslot provides a computerized slot machine with Las Vegas-style graphics. Draw poker, another gambler's game, provides a special high/low double-draw feature.

In Super Alien, the player is trapped in a maze along with aliens who must be captured before they attack. The Midnight Drive cartridge turns the VIC keyboard into the dashboard of a race car. Play action combines road racing, time trials and night driving.

In the final game cartridge, Magic Mouse, the player tries to find and eat all the cheese before time runs out, or before he is caught by an enemy rat or a black cat.

The price of the game cartridges is \$29.95 each.

For more information: Commodore Business Machines, Computer Systems Division, 681 Moore Rd., King of Prussia, PA 19406; (215) 337-7100.

TREASURE HUNT

Cave Hunter, an action game for the 16k TRS-80 Color Computer, is a fast-paced arcade game using high-resolution graphics, sensational colors and a variety of sounds.

The game requires that you maneuver your way to the bottom of an old cave to retrieve the treasures. Passages lead in all directions and angry cave creatures pursue you.

The price is \$24.95.

For more information: Mark Data Products, 23802 Barquilla, Mission Viejo, CA 92691; (714) 768-1551. 

SOFTWARE INDEX

A COMPREHENSIVE LISTING OF NEW PRODUCTS

BUSINESS

PRODUCTS/FEATURES/PRICE COMPANY/AVAILABILITY

GENERAL ACCOUNTING

BILL MASTER uses client names for data entry for CP/M systems \$395	Advanced Solutions, Inc. Sunnyvale, CA 94086 mail order CIRCLE 260
--	---

Business Bookkeeping cash accounting for Apple II and Apple II Plus \$395	Dakin5 Denver, CO 80221 retail see story on page 102 CIRCLE 261
--	---

General Accounting System prepares complex financial statements for PC-8000 Series \$395	NEC Home Electronics USA Elk Grove Village, IL 60007 retail CIRCLE 262
--	---

EXECUTIVE/PROFESSIONAL

Attorney's Time and Billing accounting system for law offices for Zenith Z89 \$950	PK Systems, Inc. Bloomington, IL 61701 mail order CIRCLE 263
--	---

Creative Financing for Real Estate answers financial questions for buyer/seller for Radio Shack Pocket, Sharp PC 1211, Casio FX-702P \$80	PeraSoft, Inc. Portland, OR 97217 mail order CIRCLE 268
---	--

GrafTalk provides visual representations for SB-86 and CP/M compatible computers \$450	Lifeboat Associates New York, NY 10028 mail order CIRCLE 269
--	---

GUARDIAN personal calendar organizer for CP/M-based systems, or TRS-80 Models I, II, III \$199.95	Time Management Software Cushing, OK 74023 mail order CIRCLE 270
---	---

IDM-I data base management for IBM Personal Computer \$198	Micro Architect, Inc. Arlington, MA 02174 mail order CIRCLE 271
---	--

Budget Planner modeling and developing budgets for Apple II and Apple II Plus \$150	Dakin5 Denver, CO 80221 retail see story on page 102 CIRCLE 264
---	---

microplanTM

the electronic worksheet for CP/M[®] users.

AUTOMATIC
WHAT-IF

MODE=NORMAL ORDER=R/O ROW=1-50 COL=1-20

ROW 1 (Net Sales) <--
ENTER COMMAND:

ROW	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Total	40 MATH:
1 Net Sales	1,000.0	1,100.0	1,210.0	1,331.0	4,641.0	41 ADD
2 Cost of Good	450.0	489.5	532.4	579.0	2,050.9	42 SUBTRACT
3 Gen & Admin	200.0	220.0	242.0	266.2	928.2	43 MULTIPLY
4 Res & Develo	300.0	350.0	400.0	450.0	1,500.0	44 DIVIDE
5 Total Costs	950.0	1,059.5	1,174.4	1,295.2	4,479.1	45 NEGATE
6 Gross Profit	50.0	40.5	35.6	35.8	161.9	46 INVERSE
7 % Profit	5.0	3.7	2.9	2.7	3.5	47 INTEGER
8	0.0	0.0	0.0	0.0	0.0	48 ROUND
9	0.0	0.0	0.0	0.0	0.0	49 CUMULATE
10 % C.O.G.S.	45.0	44.5	44.0	43.5	0.0	50 ABSOLUTE
11	0.0	0.0	0.0	0.0	0.0	51 ADD K
12	0.0	0.0	0.0	0.0	0.0	52 SUB K
13	0.0	0.0	0.0	0.0	0.0	53 MULT K
14	0.0	0.0	0.0	0.0	0.0	54 DIV K
15	0.0	0.0	0.0	0.0	0.0	55 SUM
16	0.0	0.0	0.0	0.0	0.0	56 GET
17	0.0	0.0	0.0	0.0	0.0	57 ZERO
						58
						59

BUILT-IN REPORT
GENERATOR

ELECTRONIC
WORKSHEET

COMMAND
MENU

"The best piece of software . . . ever!"

The industry is buzzing with comments on MicroPlan. Users have supplied unqualified quotes "the best . . . ever."

ALTOS COMPUTERS agrees. The ALTOS budgeting manager uses MicroPlan for revenue forecasts, consolidations, and everyday analysis. DURANGO's Product Manager uses MicroPlan for product pricing and for developing marketing strategies. TOSHIBA's General Manager uses MicroPlan for developing marketing strategies. The DNYABYTE VP of Finance simply says, "it's dynamite!"

And, ADDS' system staff maintains budgets; TELE-VIDEO's Controller reports financial performance; and NORTH STAR's Marketing Manager analyzes sales—all in MicroPlan.

MICROPLAN IS EASY TO USE. You don't type; so MicroPlan is designed for no typing ease. You don't think in formulas; so MicroPlan is designed for pushbutton ease. You are not a programmer; so MicroPlan eliminates all the computerese that makes life difficult.

MICROPLAN SOLVES PROBLEMS. MicroPlan lets

you solve your problems electronically. You enter values into the electronic worksheet. MicroPlan handles all the sums, percentages and ratios. Even complex depreciation, loan analysis and present value computations are supplied—all with pushbutton ease. And when you change one number, MicroPlan automatically analyzes the impact of "what-if" questions.

MICROPLAN HAS POWER. MicroPlan has more features and solves more problems. Add-on modules allow you to do consolidations, automated variance analysis, statistical calculations—it even lets you build complex models. And, with MicroPlan solution books you can apply MicroPlan to *your* business, such as, real estate, tax planning, and sales forecasting.

Call on your dealers. Find out why people are saying "MicroPlan is the best . . . ever!"

MicroPlan is available exclusively through local dealers. For more information, contact: Chang Laboratories, 10228 North Stelling Road, Cupertino, CA 95014; (408) 725-8088.

CP/M is a Registered Trademark of Digital Research.

NEW VERSION 3.0 RUNS FIVE TIMES FASTER. AVAILABLE NOW.

SOFTWARE INDEX

Cactusplot Function Plotter general purpose function plotting for Apple II \$29.95	Cactusplot Tempe, AZ 85281 mail order CIRCLE 265	PhoneSaver data-base management for CP/M-based systems \$75	Digital Systems, Inc. Hampton, NH 03842 mail order CIRCLE 274
CLINISTAT medical research for TRS-80 Model II \$10,000 (with computer)	MDp Software Great Neck, NY 11022 mail order CIRCLE 266	PROFILE III+ data base management for TRS-80 Model III \$300	The small Computer Co. Ridgewood, NJ 07450 mail order CIRCLE 275
Computicker real-time ticker tape machine for Apple II \$490	Wall Street Software New York, NY 10005 mail order see story on page 104 CIRCLE 267	Report Manager creates and updates reports PC-8000 Series \$200	NEC Home Electronics USA Elk Grove Village, IL 60007 retail CIRCLE 276
Nevada Edit text preparation for CP/M-based systems \$75	Ellis Computing San Francisco, CA 94121 mail order CIRCLE 272	STATISTICAL ANALYSIS 24 statistical programs for Apple II \$75	Basic Business Software, Inc. Las Vegas, NV 89126 mail order CIRCLE 277
Phonedex I mailing list manager for TRS-80 Model II \$49.95	Starside Engineering Rochester, NY 14618 mail order CIRCLE 273	SUPERSCREEN file management, word processing, spreadsheet Intertec SuperBrain and North Star Advantage \$500	Creative Software Concepts, Inc. Binghamton, NY 13902 retail CIRCLE 278

Give Your TRS-80* a Tremendous Boost with RACET COMPUTES Software

RACET COMPUTES Utility Software makes the TRS faster, more efficient, and easier to use. Our programming aids improve your productivity. Our reputation is for products that are professional in design and work as advertised!!!

FIELD PROVEN HARD DISK DRIVES AND OPERATING SYSTEM

Now you can use RACET's Hard/Soft Disk Operating System (HSDS) with the ARM Winchester Disk Drive on the Model II. This cost effective combination provides 15 Megabytes per drive including ECC Error Correction Code and an advanced sequencer to further ensure data integrity. An incremental backup to floppy is provided so that only those sectors that were changed from the last backup are saved. A full monthly service contract is available at \$30 per month per drive.

The HSDS Software has more than One Year's FIELD Experience. The latest HSDS version adds several enhancements including maintenance of system files on the hard drive, files as large as the disk, the ability to segment the disk as logical drives, definable directory size, and many utilities including bulk copies between floppy and hard drives, multiple purge, Superzap, and Directory Catalog System. Full program compatibility with TRSDOS 2.0a is maintained. Mixed floppy and hard drive operation is supported.

HSDS is available for the Cameo, Cynthia Bull, Corvus, Data Peripherals, and Santa Clara Systems hard disk systems as well as the ARM Winchester Drive.

ARM 15 Megabyte Drive Subsystem \$3895. HSDS Software \$400.
Cameo 5/5 Cartridge Drive \$5995. Cynthia Bull 10/10 Drive \$7995

NEW PRODUCT ★ Model II Fast Backup Utility ★ \$75

5 to 10 times faster backups!!! Full disk backup (including verify) 55 seconds!!! on two drive system — 2:15 on single drive system. In business, time is money, and one BACKUP is worth 1000 tears!!

NEW PRODUCT ★ INTEGRATED BUSINESS SYSTEM ★

ISAM File Structure — Multi-Company Capability. Modular structure. Each module includes complete user documentation which guides the user through installation and allows "practice" using a sample data base. When ready, the user simply names his data base and begins. The Integrated Business System program set includes General Ledger, Accounts Receivable, Accounts Payable, Payroll, Inventory, General Journal, Asset Management and more.

Business Programs \$250/module Mod III, \$300/module Mod II, \$795 for all four Mod III, \$995 for all four Mod II. General Ledger and Accounts Receivable available now. Accounts Payable and Payroll 1st Quarter 1982.



CIRCLE READER RESPONSE BELOW FOR FREE CATALOG
*TRS-80 IS A REGISTERED TRADEMARK OF TANDY CORPORATION

CHECK, VISA, M/C, C.O.D., PURCHASE ORDER
TELEPHONE ORDERS ACCEPTED (714) 997-4950

CIRCLE 42

GET THE MOST FROM YOUR NEC PC-8001 WITH RACET COMPUTES SOFTWARE!!

RACET NECDOS \$175

RACET NECDOS does more for your PC-8001 than any other DOS. It's faster, more efficient and easier to use. It's loaded with extra features to let you stretch the limits of your system. This advanced operating system works with the ROM NBASIC to give full compatibility with color and other BASIC commands.

USER FRIENDLY — Emphasizes Integrity. No MOUNT or REMOVE commands!!! Excellent protection from improper diskette swapping. AGAIN, HELP, FIND and REF commands. File password protection.

ADVANCED DESIGN. RACET NECDOS utilizes the computer in the 8031 for most disk I/O functions minimizing memory utilization in the PC-8001. The Dynamic Transient Area (DTA) allows multiple transients to be scatter loaded and relocated in memory simultaneously. This unique capability optimizes use of valuable memory, yet provides an almost limitless growth potential.

ADVANCED FEATURES. All DOS functions and commands may be used directly in a BASIC program!!! Special RUN option allows merging of programs, retaining all variables in memory. Fixed block spanned records. AUTO and DO commands. Machine language loads and saves. MATPRINT and MATINPUT to disk. Complete directory. ALL supervisory calls documented and available to the machine language programmer. Superzap utility included.

CONVERT TRS-80* PROGRAMS TO RACET NECDOS WITH 'PROTRAN' \$99.95

COMPLETE utilities for file transfer and BASIC program conversion. Model III diskettes may be read directly. Model I and II via RS-232. Transfer BASIC programs, data files, or machine language files. NO support is provided for conversion of machine language files or PEEK's, POKE's, or USR's to function on PC-8001. Includes Mod I, Mod II and RACET NECDOS Datadisk with complete documentation on conversion requirements and syntax differences.

MULTI-KEY SORT 'MKS' \$60

SUPER FAST Machine Language In-Memory Sorts. Three-key sort on 500 elements in 4 Seconds!!! Simple one-line BASIC functions — SORTV and SORTC verbs. Mixed ascending and descending keys.

KFS-80 KEYED FILE SYSTEM \$150

Machine language BASIC ISAM utility provides keyed and sequential access to multiple files. Simple interface to BASIC. Binary tree keyed-file index system provides rapid access to records.

RACET COMPUTES software for the NEC is distributed by the Waybern Corporation and is available from your local NEC Dealer.

Waybern Corporation

13911 Enterprise Dr., Garden Grove, CA 92643
(714) 554-4520 • (213) 222-7514

CIRCLE READER RESPONSE BELOW FOR FREE CATALOG

RACET COMPUTES

CIRCLE 43



Every Apple Is Created Equal. But It Doesn't Have To Stay That Way.

An Apple™ is really something. But from now on, it's going to be something much more. How come? Simple. We're introducing three revolutionary new data communication packages, called Transend™, designed especially to make your Apple II™ rise above all others.

Our Transend data communications software provides access to information utilities; complete file transmission of charts, VisiCalc™ reports, and entire programs; as well as all electronic mail functions.

Transend comes in three different versions. You can begin economically with the simplest form, Transend 1, an intelligent terminal/file transfer system. As your needs increase, you can move up to two other Transend packages, without worrying about retraining or repurchasing. Transend 2 gives any Apple II intelligent terminal capabilities, plus file transfer with complete error detection and

automatic retransmission for demanding business applications. Transend 3 incorporates electronic mail—with password security, text editing, mailbox with mailstop, untended scheduling and receiving, automatic redialing, and much more.



Transend's support of most popular Apple II "add-in" cards and modems lets you upgrade your Apple without hassle or unnecessary expense. And you'll immediately cut operating costs by as much as 30% with simple, easy-to-use menus, data compression and 1200-baud modem support.

Nobody on the personal computer scene today is offering the speed, flexibility, and reliability of Transend in a single upgradable software system.

Don't miss this chance to uplift your Apple II. Contact us or your dealer for all the delicious details.

SSM Microcomputer Products, Inc.,
2190 Paragon Drive, San Jose, CA
95131, (408) 946-7400, Telex: 171171,
TWX: 910-338-2077.



The Transformation People

CIRCLE 49

Apple and Apple II are trademarks of Apple Computer, Inc. VisiCalc is a trademark of Personal Software, Inc. And Transend is a trademark of SSM Microcomputer Products, Inc.

SOFTWARE INDEX

TWG/ARIMA
forecasting
for Apple II
\$300

Winchendon Group
Alexandria, VA 22310
retail
CIRCLE 279

TSMART
smart terminal program
for ATARI 800
\$79.95

The MicroPeripheral Corp.
Redmond, WA 98052
mail order
CIRCLE 286

WITS/ECONOMIST
develops financial and
marketing strategies
for Heath/Zenith Model Z801
\$495

WITS World Information
Technology Systems
Willowdale, Ontario,
CANADA
mail order
CIRCLE 280.

COMMUNICATIONS

ASCOM
receive and transmit data files
for IBM Personal Computer
\$175

Westico
Norwalk, CT 06855
mail order
CIRCLE 289

Transend Series
data communications software
for Apple II
\$89, \$149, \$275

SSM Microcomputer
Products
San Jose, CA 95131
retail
see story on page 102
CIRCLE 285

Ampersoft
provides extra
programming space for RAM
card users for Apple II Plus
\$59.95

Apple-Aids
disk-based programming utilities
for Apple II or Apple II Plus
\$49.95

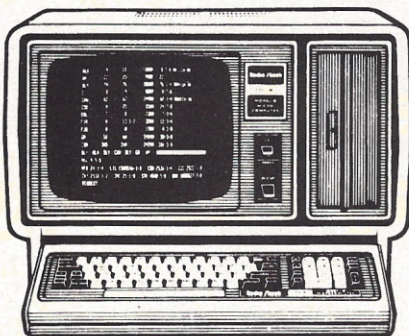
CRTI
produce error free RM/COBOL
source programs
for CP/M, MP/M and OASIS
systems
\$1500

Micro-SPARC Systems
Division
Lincoln, MA 01773
retail and mail order
CIRCLE 287

Advanced Operating Systems
Michigan City, IN 46360
retail and mail order
CIRCLE 288

Cybernetics
Huntington Beach, CA
mail order
CIRCLE 289

(continued on page 114)



Model II
26-4002

\$3288⁰⁰

8 Megabyte

Hard Disk

(Primary)
26-4150.

\$3994⁰⁰

DISCOUNT TRS-80[®] Computers

We have the Largest Inventory in the Central United States. Discount prices on all software and accessories for your TRS-80 computer needs.

**BUY
DIRECT**
Toll Free Order:
1-800-835-9056
Kansas Residents:
1-800-362-9091

- ★ No out of state Taxes
- ★ Immediate Shipment
- ★ Several Payment Methods
- ★ Direct Buying

Jimscot, Inc.

P.O. Box 607 - 1023 N. Kansas
Liberal, Ks. 67901

**WRITE TODAY FOR YOUR
FREE CATALOG!**

TRS-80 is a Registered Trademark of Tandy Corporation

**More Apple II owners choose
Hayes Micromodem II than any
other modem in the world.**

Compare these features before you buy.

You should. It's your money. Thousands of Apple II owners have already compared, considered, and now they are communicating — with Micromodem II. The best modem for your Apple II. The most modem for your money!

A complete data communication system for the Apple II. The Micromodem II is not "base priced" *plus* necessary "options." It's a complete, high-performance system, designed specifically for your Apple II and ready immediately to put you in communication with all of North America.

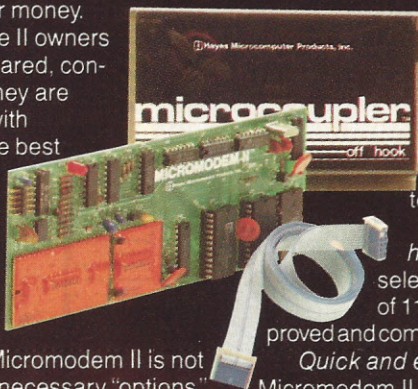
Unexcelled receive sensitivity level. Receive sensitivity levels determine the range of error in data transmission.

Micromodem II's excellent receive sensitivity level promises you clearer, more accurate transmission.

Auto-dial and answer features built in. Automatically dials the telephone, answers the telephone, receives and transmits and hangs up the telephone — completely unattended. You can take advantage of low evening and week-end telephone line rates.

Operation can be full or half-duplex. And with user selectable transmission rates of 110 or 300 bps. FCC approved and completely Bell 103 compatible.

Quick and easy installation. The Micromodem II plugs directly into the Apple II, eliminating the need for a serial interface card. And the Microcoupler™ (included) connects the Apple II directly to a standard RJ11 modular telephone jack, eliminating the losses and distortions associated with acoustic couplers.



Plus a wide variety of software, available right now! Because of our position in the industry, numerous sources have developed software *specifically* for the Micromodem II. The versatility of these prepared programs gives you a distinct advantage as an Apple II owner. Available in computer stores nationwide.

So if you're ready to communicate with other computers... or to access large time-sharing systems like THE SOURCE®, AMERICA'S INFORMATION UTILITY®, then you're ready for Micromodem II. Come on. Compare. Consider. And you'll discover the time is ripe to join the thousands of happy Apple II owners who are communicating with Micromodem II's complete system capability.

Available at computer stores all across America — call or write for the location nearest you. And don't settle for anything less than Hayes.



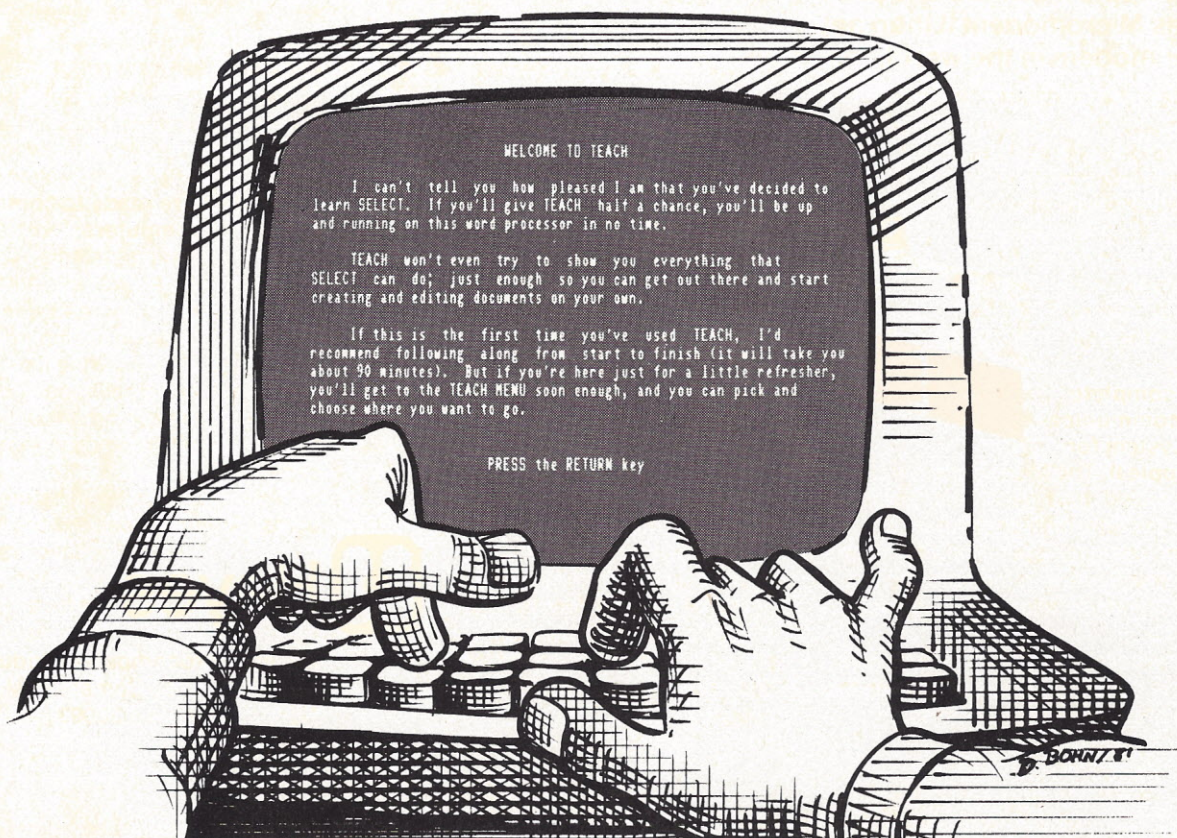
Hayes

Hayes Microcomputer Products, Inc.
5835 Peachtree Corners East,
Norcross, Georgia 30092 (404)449-8791

**Your Apple II*
just isn't the same without a
Hayes Micromodem II.™**

The Micromodem II can also be used with Bell & Howell Computers. ™ Micromodem II and Microcoupler are trademarks of Hayes Microcomputer Products, Inc.
* THE SOURCE and AMERICA'S INFORMATION UTILITY are service marks of Source Telecomputing Corporation, a subsidiary of the Reader's Digest Association, Inc.
* Trademark of Apple Computer, Inc. © 1981 Hayes Microcomputer Products, Inc. Sold only in the U.S.A.

TYPE "T" FOR TEACH.TM



THAT'S ALL YOU DO TO LEARN SELECT.TM

SELECT is the only word processor with this unique teaching program. TEACH takes you through each of SELECT's commands. Step by step you interact with the computer and see your progress on the screen. You can learn the basics of this fully featured word processor before you take it home. And at the end of your TEACH program (90 minutes or less) you'll be ready to use SELECT to compose, reorganize, file and manipulate just about any document you want.

When you want to Create or Erase, Move or Zap, key only the first letter of the command. After committing your document to SELECT, polish it with the help of SUPERSPELLTM. SELECT's multi-thousand word spelling dictionary scouts out your spelling and typing errors and helps you correct them. SELECT's merge feature integrates your mailing lists with SELECT documents to simplify billing, forms and advertising.

SELECT runs on any CP/M based hardware and you'll see it displayed on more new hardware this year. Ask your dealer to sit you down in front of SELECT. Wave him away. Type "T" — you've just enrolled in the common sense school of word processing.

SELECT...The Word Processing PeopleTM



* SELECT, SUPERSPELL, and TEACH are trademarks of Select Information Systems, Inc.
** CP/M is a trademark of Digital Research.

919 Sir Francis Drake Boulevard • Kentfield, California 94904 • (415) 459-4003

CIRCLE 84

NEW PRINTERS. NEW PERIPHERALS. SAME OLD RELIABLE QUALITY AND VALUE.

1982 will find more OEM's, businesses, dealers and personal computer users turning to MICROTEK than ever before.

TekWriter-1



80 Column Dot Matrix Printer (Formerly BYTEWRITER-1)

The Tekwriter-1 printer is, dollar for dollar, the finest value in the industry. And we've proved it by comparing the Tekwriter-1 to the Epson MX-80. Our print speed is 14 lines per minute faster, our life expectancy is longer, the character sets are the same, and the interface, warranty and printhead replacement cost are all identical.* But the biggest difference is the price. The Tekwriter-1 is about \$300 less.

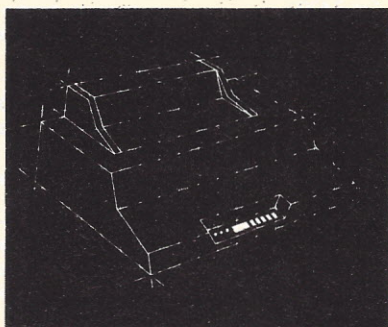
Our extensive testing has proved that the Tekwriter-1 interfaces problem-free to most parallel Centronics and serial (RS-232) computers.

The Tekwriter-1 is tough to beat for performance and quality.

*Data Source: Epson MX-80 Operation Manual

Parallel \$349
Serial \$389

TekWriter-2



NEW! 80/132 Column Dot Matrix Printer

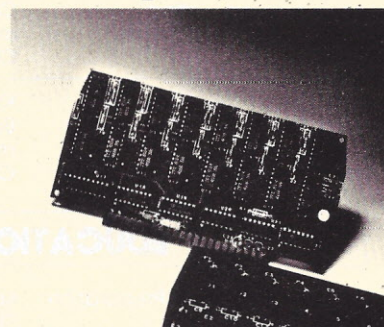
The Tekwriter-2 is perfectly suited to personal, business or OEM applications. Tekwriter-2 is designed to accept single sheet, roll or pin feed paper. It has a 9-wire dot matrix impact print head which produces crisp characters and has underlining capability. The printer is manufactured to run extremely quietly even while operating at peak output levels.

Tekwriter-2 is especially well suited to handle word processing applications because of its data buffer expansion capabilities to 25K. This ability makes it an efficient graphics generator.

Parallel interface (Centronics type). Interfaces all models of TRS-80, Apple, and Atari 400/800, and most computers with Centronics printer interface.

\$695

Peripherals



Parallel/Serial Data Buffer Converter

Interfaces with most computers and printers on the market today. Switch selectable parallel or serial input/parallel or serial output. Ideal for word processing and data communications. Data buffer 2K standard — expandable to 62K. Serial I/O BAUD rates switch independently selectable.

16K Apple Memory Board

Apple Parallel Interface Card

16K-32K Atari Memory Boards

Atari Parallel or Serial Printer Cables

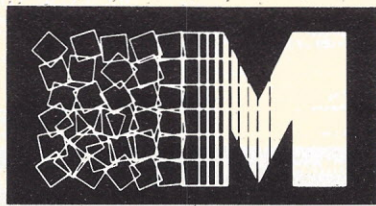
8K-16K VIC-20 Memory Boards

64K to 256K IBM Memory Board

Quantity and OEM discounts available.

Continuing our quest for excellence.

TRS-80 is a trademark of Radio Shack, Inc.
Apple II is a trademark of Apple Computer, Inc.
Atari 400/800 are trademarks of Atari, Inc.
Microsoft is a trademark of Microsoft Consumer Products, Inc.
Z-80 is a trademark of Zilog, Inc.
Visicalc is a trademark of Personal Software, Inc.



MICROTEK inc.

CIRCLE 59

MICROTEK
9514 Chesapeake Drive
San Diego, CA 92123
(714) 278-0633
Outside CA call
Toll Free (800) 854-1081
TWX. 910-335-1269

SOFTWARE INDEX

UTILITY

(continued from page 110)

GENESIS
aid in program writing
for CP/M-based systems
\$500

KWICOS
adds DISK-like commands to
Level II BASIC
for TRS-80 Model I
\$24

Time Management Software
Cushing, OK 74023
mail order
CIRCLE 290

KWIK Software
Bolivar, MO 65613
mail order
CIRCLE 291

EDUCATIONAL

Competency Exam Preparation Series
simulated examination modules
for Apple II, PET, TRS-80 Model I
\$2499

MasterType
typing instruction game
for Apple II
\$39.95

Krell Software
Stony Brook, NY 11790
mail order
see story on page 104
CIRCLE 280

Lightning Software
Palo Alto, CA 94306
mail order
CIRCLE 282

LEISURE/HOME

CAVE HUNTER
arcade game with graphics
for TRS-80 Color Computer
\$24.95

Guns of Fort Defiance
arcade-type strategy game
for ATARI 800, Apple II, PET,
CBM, TRS-80 Models I, III
\$20

**Games: Jupiter Lander, VIC
Avenger, Superslot, Draw Poker,
Super Alien, Midnight Drive,
Magic Mouse**
for VIC 20
\$29.95 each

MAZERACE
board-type game involving
chance and strategy
for TRS-80 Color Computer
\$22.95

Mark Data Products
Mission Viejo, CA 92691
mail order
CIRCLE 294

The Avalon Hill Game Co.
Baltimore, MD 21214
mail order
CIRCLE 295

**Commodore Business
Machines**
King of Prussia, PA 19406
retail
see story on page 106
CIRCLE 296

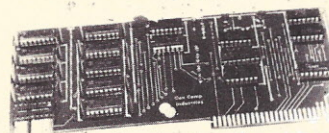
Computerware
Encinitas, CA 92024
mail order
CIRCLE 297

NO RISK * MAIL ORDER DISCOUNTS * Call for details

Apple Cards and Hardware

16K RamBoard by ConComp Industries	129
Hayes Micromodem II	299
Novation Apple-Cat	339
Videx Videoterm 80 Column card	249
Videx Keyboard Enhancer	115
Z-80 Softcard by Microsoft	299
16K RamCard by Microsoft	159
Thunderclock Plus clock/calendar card	129
Smarterm 80 column card	299
Corvus Winchester Hard Disk Drives	CALL
ALF 3 Voice Music Card	199
ALF 9 Voice Music Card	149
Lazer Keyboard Plus	55
23 Key Numeric Keypad by Keyboard Co.	99
Joystick II by Keyboard Co.	45
6809 CPU Card (The Mill) by Stellation	319
AIO Serial & Parallel Interface by SSM A&T	189
Music System (16 voices)	299
A/D + D/A Interface	279
Expansion Chassis (8 slots)	569
Introl X-10 Controller Card	169
Clock/Calendar Card	225
CPS Multi-Function Card	175
SuperTalker SD-200	159
Romplus + Card	135
Romwriter Card	149
Symtec Hi-Res Light Pen	210
Sup-R-Fan ventilation system for Apple II	45
Sup-R-Terminal 80 column card by M&R	329
SVA ZVX4 Megabyte 8" Disk Controller	589
SVA 2+2 Single Den. 8" Disk Controller	345
Speechlink 2000 by Heuristics	249
Versawriter Digitizer Tablet	229
Asynchronous Serial Interface card by CCS	139
Centronics Parallel interface card by CCS	119
We carry all California Computer System Cards	CALL
We stock many more items for the Apple II.	
Please call or write for current price list.	

16K RAMBOARD by ConComp
for Apple II Computers
FOR ONLY \$99



VIC-20 \$249

Personal Computer
Color * Sound * Graphics
Call or write for more info.
Disk drives available soon!



Video Monitors

Amdek/Leedex Video 100 12" B&W	129
Amdek/Leedex Video 100G 12" Green Phosphor	149
Amdek (Hitachi) 13" Color w/ audio output	389
NEC 12" Green Phosphor Display JB-1201M	CALL
NEC 12" Lo-Res Color Display	CALL
NEC 12" Hi-Res RGB Color Display	CALL
Sanyo 9" B&W Display	185
Sanyo 9" Green Display	CALL
Sanyo 12" B&W Display	269
Sanyo 12" Green Phosphor Display	285
Sanyo 13" Color Display	449
Zenith 12" Green Phosphor Display	139

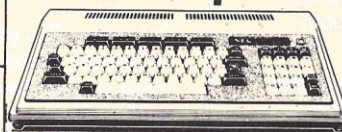
Printers

Anadex 9501 w/ 2K Buffer	1349
C. Itoh Starwriter 25 CPS daisywheel	1449
C. Itoh Starwriter 45 CPS daisywheel	1649
Epson MX-70	CALL
Epson MX-80 & MX-80 FT	CALL
Epson MX-100	CALL
NEC 8023 Impact Dot Matrix	629
NEC Spinwriters (Latest models)	CALL
Paper Tiger IDS-560G w/ graphics	899
Paper Tiger IDS-560G w/ graphics	1099
Qume Spring Daisywheels (Latest models)	CALL
Diablo 630 Daisywheel 40 CPS	1795

Software for the Apple

VisiCalc version 3.3	199
VisiFile (NEW data base manager)	249
VisiTrend/VisiPlot	249
VisiDex	199
VisiTerm	99
Desktop Plan II	159
DB Master	189
Wordstar (Apple 80-col version)	299
Easywriter Word Processor (80 col)	199
Tax Preparer	199
Real Estate Analyzer	129
Creative Financing	139
Personal Filing System (PFS)	79
Peachtree Accounting Software	CALL
BPI Accounting Software	CALL
Systems Plus Acctg Software	CALL

NEC Microcomputer



CALL FOR BEST PRICES

4 Mhz Z-80A Operation
80 or 40 column modes STANDARD
Built-in Centronics printer port
Full ASCII keyboard with Shift lock
Real Time Clock STANDARD
RGB Color Output
Mixed text and graphics
Numerica Keyboard STANDARD
CP/M Compatibility
5 programmable Function keys
24K Microsoft BASIC in ROM with enhanced color/ graphic commands

The NEC PC-8001A has all these features and more. Expandability you want, expandability you get. Through the use of the PC-8012A I/O unit, total system RAM can be extended to 160K. The PC-8031 Dual Disk Drive puts 286K of floppy disk storage at your command.

The NEC PC-8001A has so many things that are options on other computers built right in that you may never have to buy another accessory! The quality that the NEC name has come to stand for has been built-in, too. Compare the competition, and then call Consumer Computers for the NEC PC-8001.

NEC COMPATIBLE SOFTWARE

CP/M Operating system with graphics control	CALL
SUPERCALC Financial & Scientific Modeling (requires CP/M)	CALL
WORDSTAR Word Processing System (requires CP/M)	CALL
SYSTEMS PLUS Complete Accounting System (requires CP/M)	CALL
MICROSOFT BASIC-80 (requires CP/M)	CALL
MICROSOFT FORTRAN-80 (requires CP/M)	CALL
MICROSOFT COBOL-80 (requires CP/M)	CALL

ATARI 800 16K



CALL FOR BEST PRICE

Atari 400 w/ 16K	349
410 Program Recorder	61
810 Disk Drive	449
825 80 col. 7x8 Dot matrix impact printer	699
822 40 col. Quiet Thermal Printer	349
850 Interface Module	151
Atari 16K Ram Module	61
Axon Ramcam 32K Module	181



IBM ACCESSORIES BY TECMAR

256 K Dynamic Ram Card	CALL
Hi-Speed Parallel I/O Card	FOR
Hi-Speed Serial I/O Card	BEST
Real-Time System Clock	PRICES
Card Expansion Chassis	

Ordering Information: Phone orders using VISA, MASTERCARD, AMERICAN EXPRESS, DINER'S CLUB, CARTE BLANCHE, bank wire transfer, cashier's or certified check, money order, or personal check (allow ten days to clear). Unless prepaid with cash, please add 5% for shipping, handling and insurance (minimum 5.00). California residents add 6% sales tax. Foreign customers please add 10% for shipping. OEM's, Institutions and corporations: please send for a written quotation. All equipment is subject to price change and availability without notice. All equipment is new and complete with manufacturer's warranty (usually 90 days). Showroom prices may differ from mail order prices.

Send Orders To:
consumer computers Mail Order

**8314 Parkway Drive
La Mesa, Calif. 92041**

**ORDER TOLL FREE
800-854-6654**

**In California and
outside continental U.S.**

(714) 698-8088

Telex 695-000 Beta CCMO

QUALITY SOFTWARE FOR TRS-80 COLOR!



ADVENTURES!!!!

For TRS-80, and COLOR-80. These Adventures are written in BASIC, are full featured, fast action, full plotted adventures that take 30-50 hours to play. (Adventures are inter-active fantasies. It's like reading a book except that you are the main character as you give the computer commands like "Look in the Coffin" and "Light the torch.")

Adventures require 16K on COLOR-80 and TRS-80. They sell for \$14.95 each.

ESCAPE FROM MARS

(by Rodger Olsen)

This ADVENTURE takes place on the RED PLANET. You'll have to explore a Martian city and deal with possibly hostile aliens to survive this one. A good first adventure.

PYRAMID (by Rodger Olsen)

This is our most challenging ADVENTURE. It is a treasure hunt in a pyramid full of problems. Exciting and tough!

TREK ADVENTURE (by Bob Retelle)

This one takes place aboard a familiar starship. The crew has left for good reasons - but they forgot to take you, and now you are in deep trouble.

DEATH SHIP (by Rodger Olsen)

Our first and original ADVENTURE, this one takes place aboard a cruise ship - but it ain't the Love Boat.

VAMPIRE CASTLE (by Mike Bassman)

This is a contest between you and old Drac - and it's getting a little dark outside. \$14.95 each.

SPACE SHUTTLE

ONE OR TWO PLAYER HIGH RES GAME -

Your mission is to dock with an orbiting space platform - but you may have to land on the planetary surface for refueling first. A real value in a high res real time game. \$6.95.

KILLERBOT - (Available in 4K) - Real time action at 20 levels of difficulty as you run, sneak, and dodge your way through a bloody field of Killer Robots. Get across or die! Joysticks or Keyboard controls. TRS-80 COLOR (ANY BASIC 4K or more.). \$9.95.

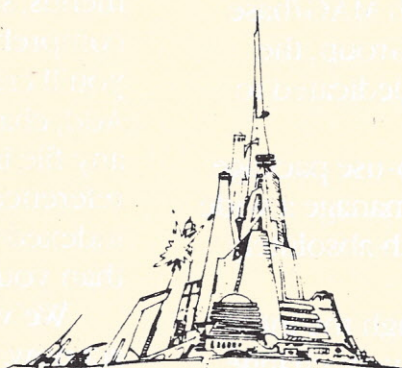
SLASHBALL (Available in 4K) - This one is best described as a thinkers arcade game. It rewards fast reflexes and clear thinking - like nothing you have ever seen before. It is one of our best family games for one or two players. \$9.95.

TIMETREK - A REAL TIME, REAL GRAPHICS STARTRECK. See your torpedoes hit and watch your instruments work in real time. No more unrealistic scrolling displays! \$14.95.

STARFIGHTER - This one man space war game pits you against spacecruisers, battlewagons, and one man fighters, you have the view from your cockpit window, a real time working instrument panel, and your wits. Another real time goody. \$9.95

BATTLEFLEET - This grown up version of Battleship is the toughest thinking game available on OSI or 80 computers. There is no luck involved as you seek out the computers hidden fleet. A topographical toughie. \$9.95

LABYRINTH - 16K EXTENDED COLOR BASIC - With amazing 3D graphics, you fight your way through a maze facing real time monsters. The graphics are real enough to cause claustrophobia. The most realistic game that I have ever seen on either system. \$14.95.



QUEST - A NEW IDEA IN ADVENTURE GAMES! Different from all the others, Quest is played on a computer generated map of Alesia. Your job is to gather men and supplies by combat, bargaining, exploration of ruins and temples and outright banditry. When your force is strong enough, you attack the Citadel of Moorlock in a life or death battle to the finish. Playable in 2 to 5 hours, this one is different every time. 16K COLOR-80 OR TRS-80 ONLY \$14.95.



SPACE ZAPPER - Protect your central Star Base from ships that attack from all four sides. Fast reflexes are required as the action speeds up. Great for kids or Dads. This game has high speed high resolution graphics and looks as if it just stepped out of the arcades. - 16K extended or 32K disk. BASIC TRS-80 Color only. \$14.95.

Please specify system on all orders

This is only a partial listing of what we have to offer. We have arcade and thinking games, utilities and business programs for the OSI and TRS-80 Color. We add new programs every week. Send \$1.00 for our complete catalog.



TRS 80

**2352 S. Commerce, Walled Lake, MI 48088
(313) 669-3110**

AARDVARK - 80

TRS 80 COLOR

Introducing
MAG/base™

NO SOFT

Now you can buy our Data Base Management System at up to 20% OFF with a money-back guarantee!

You should be able to sit down at your computer system and develop your own applications easily, quickly and without programming.

And now you can with MAG/base from Micro Applications Group, the software company that's dedicated to simplicity.

This powerful, easy-to-use package allows you to create and manage a wide variety of information with absolutely no programming.

You can browse through the information rapidly and selectively, change or delete information, and produce published reports the way that *you* want them.

It's flexibility and ease of use make it ideal for a complete range of applica-

tions such as:

Mailing Lists—Patient, client or customer records—Real Estate Listings—Inventory Control—Information Tracking—Billing—Sales Analysis.

Features include extensive use of menus, simple operator dialogue, and comprehensive error handling... so you'll create new data bases in minutes. Add, change and delete records from any file in seconds. Access and cross reference your data instantly with indexed files. And you'll do so *easier* than you can imagine.

We've eliminated the risk. If you act now, before June 30, 1982, we'll send you MAG/base² for 20% off the suggested list price.

We know you'll be happy. If, however, within 30 days you are not satisfied, we'll return all of your money. Just send MAG/base back to us.

RISK WARE

SPECIFICATIONS:

MAG/base²—Our information management system allows you to create and maintain lists of your customers, parts, vendors, employees, subscribers, WHATEVER. Includes multi-keyed files, powerful forms generator, and versatile report generator with totals. It includes a comprehensive report writer which provides relational record selection and sorting, nine levels of control breaks for sub-totals, calculations, headers, footers, and free-form formatting for checks, invoices and special forms as well as tabular reports.

COMPATIBILITY—MAG/base is compatible with Altos, CDC 110, CPT 8000, Cromemco, Datapoint 1550, DEC VT-180, Digital Microsystems, Dynabyte, Heath, HP-125, IBM Display Writer, IMS, ISC, Ithaca Intersystems, MicroDaSys, Micromation, Monroe, National Semiconductor 6600, Novell, Ohio Scientific, Pertec PCC 2000, Quay, Rair, TEI, TRS-80, Vector Graphic, Wangwriter, Xerox 820 and 860, Zenith, and many others.

MAG/base operates on 8080, 8085, 8086, 8088, Z80, Z8000 and 68000 based computers with 48K of user memory running under CP/M, CP/M-86, MP/M, MP/M-86 and Unix operating systems. CBASIC is required with some systems. Also requires 24 x 80 display screen and 2-8" disk drives. CP/M, CP/M-86, MP/M, MP/M-86 and CBASIC are trademarks of Digital Research. Unix is a trademark of Western Electric.

Mail this coupon or call us and order today. I want the best and I don't want to take any risks! Please send me MAG/base² regular \$495, now \$395.

Name _____

Company _____

Title _____

Address _____

City _____ State _____ Zip _____

Phone _____

Name of computer system (manufacturer) _____

Operating System _____

☐ Please send me information about your *other* easy-to-use software.

Software to simplify your life.

MAG

MICRO APPLICATIONS GROUP

20201 Sherman Way, Suite 205, Canoga Park, CA 91306,
phone (213) 700-1426

Note: We ship 8-inch disk format—Visa and Mastercard
accepted. Allow 6-8 weeks for delivery.



MicroGANTT is a sophisticated project planning system which uses Critical Path Method (CPM) techniques and PERT to determine task dependencies and project completion dates. The user creates tasks, assigns costs and defines task dependencies. The interactive system immediately redisplay the project plan as data is entered. Projects are displayed as Gantt charts, labor time summaries and financial summaries.

MicroGANTT features: ■ Time scale of days, weeks, months, quarters or years can be varied at any time to present more or less detail. ■ Accommodates unlimited number of tasks in a project plan. ■ Detailed sub-projects can be included as tasks in a project model. ■ Assumptions are easily modified to make "What if?" analyses. ■ Single key-stroke commands page through tasks and calendar of events on display screen. ■ Single key-strokes switch the display from Gantt chart to labor time summary to financial summary. ■ Partial allocation of manpower to tasks. ■ Partial completion of prerequisite tasks. ■ All charts, reports and plans can be printed.

Available for **IBM Personal Computer** and CP/M compatible computers. Software and manual \$395. Manual alone \$25.

4 ways to order:

- Write Westico, Inc., 25 Van Zant Street, Norwalk, CT 06855
- Call (203) 853-6880
- Telex 643-788
- Dial-up our 24-hour computer (300 baud) (203) 853-0816

copyright © 1982 Westico, Inc.

WES-44

WESTICO
The Software Express Service

BOOK REVIEWS

Dedicated to the proposition that all decisions are difficult

HOW TO WIN WITH INFORMATION OR LOSE WITHOUT IT

ANDREW P. GARVIN AND HERBERT BERMONT
BERMONT BOOKS
171 pp., \$26

"Information is power," say authors Garvin and Bermont, because the right information in the proper form can be the most valuable commodity in the world. "Information can make the difference between a decision and a guess, between success and failure." And a personal computer is the key to instant access to almost every type of information imaginable.

Yet the number of people using computers who suffer from "information paralysis," the inability to proceed from the question to the actual act of beginning to gather information for an answer, is astonishing. Therefore, *How to Win with Information* is designed to raise its readers' levels of "information consciousness," that is, the ability to think in ways that result in being better informed and more resourceful, along with being able to research any question quickly, efficiently and more economically.

This book will interest personal-computer users because it makes readers aware of the various types of information available through data bases, which have grown from less than 20 in 1965 to more than 300 by 1980. Since computers usually cannot answer "how" questions, these pages show the reader how to define and refine questions because, "incorrect questions are the greatest cause of information failures." Moreover, *How to Win with Information* emphasizes that "while the information you need is probably available in some data base at a reasonable price,

it doesn't mean it will be there."

The book also provides a comprehensive list of information-retrieval services such as Garvin's FIND/SVP in New York, Arthur D. Little's Literature Research Section in Cambridge, Mass., and many others which can be accessed by a computer or data terminal. However, the authors point out that these data bases must be used continually or the computer user will get rusty from the lack of practice, which increases the cost per search.

Finally, Andrew Garvin and Herbert Bermont state that one may never know the true value of any information because "it is often measured only in relation to the cost of failure that results from not having it."

How to Win with Information or Lose without It is an excellent place to begin searching for the right information.

Are we really as information hungry as they'd have us think?

VIDEOTEXT—THE COMING REVOLUTION IN HOME/OFFICE INFORMATION RETRIEVAL

EFREM SIGEL
KNOWLEDGE INDUSTRY
PUBLICATION, INC.
152 pp., \$8.95

Within a very short period of time personal computers and color television sets will be able to receive textual information directly from local television stations or cable TV systems, via Videotext. The current "closed captioned" services for the hearing impaired used on many network programs is but the smallest tip of the Videotext iceberg. What lies beneath the icy waters is anyone's guess.

Videotext is the display of textual information, words, numbers and

We have ways...

to make it talk!

Give your computer the magic of speech with an ECHO™ Speech Synthesizer!

There are four new models to choose from: the ECHO 80 (TRS-80 models I & III), ECHO 100 (S-100), the ECHO GP (general-purpose, serial/parallel) and the ECHO SBC (single board computer). These join the popular ECHO II (Apple).

ECHO Speech Synthesizers use LPC synthesis pioneered by Texas Instruments, combined with a phoneme-based operating system to provide any vocabulary you desire while using a minimum of your computer's memory.

The TEXTALKER Speech Generator, standard with all ECHOs except the SBC, translates normal English text to speech automatically.

Simple commands allow you to select from:

- 63 different pitch levels
- Words spoken monotonically or with intonation
- Fast or slow speech output
- Entire words pronounced or spelled letter by letter
- Different volumes
- Spoken punctuation if desired

Speech applications are virtually unlimited, ranging from education to games to aiding the handicapped. The flexibility and low price of ECHO Speech Synthesizers make them the logical choice when adding speech to your system.

For more information see your dealer or contact:



STREET ELECTRONICS CORPORATION
3152 E. La Palma Avenue, Suite D
Anaheim, CA 92806 Telephone: 714/632-9950



Enchanted Forest™

"You are at the edge of the forest, paths lead to the northwest, south, and west. A weather beaten sign beside the western path says 'Entrance to the Enchanted Forest! Only fools take this path! Consider yourself warned!'"

The time of decision has come. You know there are only dead ends to the northwest. You were repulsed by the attack of the fire breathing hellhound to the south. You muster your courage, take a deep breath, and plunge westward into the forbidden forest...

"You fool! You were warned not to come this way! Now you are completely lost! !!"

Only those who master the Enchanted Forest can win this provocative 71 room adventure game.* But mastering the forest is not enough! Can you conquer the nine foot zombie and the other fiends which wait on the other side of the forest? And what are you going to do about that fire breathing hellhound?

* 54 location version available for 16K users.

16K - \$19.99 32K - \$24.99
PA Residents add 6%

Specify tape or disk and
Computer (TRS-80 Model I or
III or Apple II).

Dealer inquiries invited.

**BENCHMARK
✓ SOFTWARE**

1050 Eve Drive
Suite A
Pittsburgh, PA 15216

BOOK REVIEWS

simple diagrams on conventional TV sets or CRTs. Anything that can be stored on a computer disk can be transmitted and hidden within a standard TV broadcast picture. While Videotext service is just getting underway in the United States, two systems have been operating in England since September 1974. The British Videotext, known as Prestel, offers Teltext, a one-way communication service that uses regular TV pictures and channels; and Viewdata, an interactive system that uses standard telephone lines for accessing a huge data base.

Efrem Sigel, editor-in-chief of Knowledge Industry Publications in White Plains, N.Y., traces the brief history of Videotext—its technology, rapid growth in Britain, and some of the problems it faces in America. He notes that Videotext has many advantages to an information-hungry society since costly capital equipment such as telephone lines, cable TV lines and TV transmitters are already in place. All that is needed is an adapter for the home TV set or computer CRT, and although these adapters now cost several hundred dollars each, as production increases the cost will drop.

Since the typical Videotext signal is hidden within the TV picture, its transmission rate is slow—about one page every quarter of a second. However, when a station goes off the air between 1:30 a.m. and 5:30 a.m. it could broadcast full channel Videotext signals for these four hours. These signals would contain many thousands of pages of data which would be directed to special Videotext receivers. A typical use for this Videotext service is the so-called "electronic newspaper." But Sigel notes that the main obstacle to these papers is the development of a low-cost hard-copy printer to make the service profitable.

Sigel also writes of the potential uses of Videotext and personal com-

Anadex Printer Distributors

NORTHWEST (Oregon, Washington, W. Idaho)

Sigma Distributing
Bellevue, WA (206) 454-6307

NORTHERN CALIFORNIA

Basic Electronic Distributors
Santa Clara, CA (408) 727-1800

Terminal Rentals
San Jose, CA (408) 292-9915

Byte Industries
Hayward, CA (415) 783-8272

Computerland
San Leandro, CA (415) 895-9363

SOUTHERN CALIFORNIA

Basic Electronic Distributors
Inglewood, CA (213) 673-4300;
San Diego, CA (714) 268-8000

Terminal Rentals
Tustin, CA (714) 832-2414

SOUTHWEST

(Texas, Oklahoma, Arkansas, W. Louisiana)

Barnhill Associates, Inc.
Richardson, TX (214) 231-2573;
Houston, TX (713) 688-9971; Austin, TX (512) 451-0217

ROCKY MOUNTAIN STATES (Colorado, Wyoming,
Montana, Utah, E. Idaho, Arizona, New Mexico)

Barnhill Associates, Inc.
Englewood, CO (303) 779-3600;
Scottsdale, AZ (602) 947-7841;
Albuquerque, NM (505) 299-7658;
Murray, UT (801) 262-3000

MIDWEST (Illinois, Missouri, Kansas, Nebraska,
N. Dakota, S. Dakota, Minnesota, Indiana, W. Kentucky
Iowa, Wisconsin)

Tek-Aids, Inc.
Arlington Heights, IL (312) 870-7400

Comtel Corporation
Chicago, IL (312) 539-4838; St. Louis, MO (314) 428-5508;
Shawnee Mission, KS (913) 722-1030; Minneapolis, MN
(612) 835-3060; Indianapolis, IN (317) 253-1681;
Cedar Rapids, IA (319) 377-9434;
Brookfield, WI (414) 786-1940

NORTHEAST (Connecticut, Vermont, Massachusetts,
Maine, Rhode Island, New Hampshire)

Pat Jenks Associates
North Haven, CT (203) 239-6201;
Woburn, MA (617) 938-0488

Microamerica Distributors
Needham, MA (617) 449-4310

NEW YORK METROPOLITAN AREA

Logon, Inc.
Fort Lee, NJ (201) 224-6911 / (212) 594-8202

MID-ATLANTIC STATES (Maryland, Washington, DC,
Virginia, W. Virginia, E. Pennsylvania, S. New Jersey)

Micro Distributors, Inc.
Rockville, MD (301) 468-6450
Plymouth Meeting, PA (215) 265-1600

SOUTHEAST STATES (Louisiana, Florida, Alabama,
Mississippi, Georgia, N. Carolina, S. Carolina)

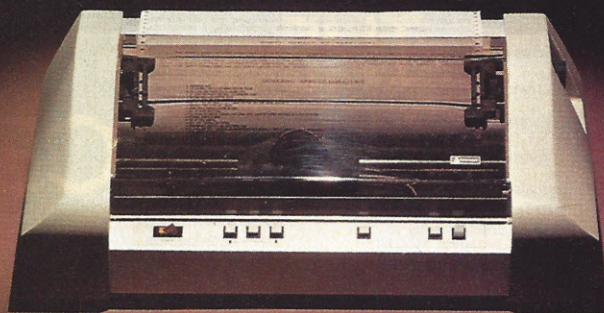
Currie, Peak & Frazier, Inc.
Huntsville, AL (205) 536-1506;
Orlando, FLA (305) 855-0843;
Greensboro, NC (919) 273-3040

CANADA
Nelma Electronics Ltd.
Mississauga, Ont. (416) 624-0334

 **Anadex**
...the plus in printers

The important plus in matrix printers:

grafixPLUS.™



Since their introduction in mid-1980, the Anadex high-resolution DP-9500 Series matrix printers have set new standards for printer quality and performance. All models feature the rugged Anadex 9-wire print head that combines long life with resolutions of 72 dots/inch vertical and up to 75 dots/inch horizontal. With this kind of resolution, fineline graphics (under data source control) and razor sharp characters are pluses built into every printer.

Performance Plus

The full standard ASCII 96 character set, with descenders and underlining of all upper and lower case letters, is printed bi-directionally, with up to 5 crisp copies, at speeds up to 200 CPS. Models DP-9500 and DP-9501 offer 132/158/176 and 132/165/198/220 columns respectively. Print densities are switch- or data-source selectable from 10 to 16.7 characters/inch. All characters can be printed double-width under communications command.

Interface Plus

Standard in all models are the three ASCII compatible interfaces (Parallel, RS-232-C, and Current Loop). Also standard is a sophisticated communications interface to control Vertical Spacing, Form Length and Width, Skip-Over Perforation, Auto Line Feed, X-On/Off, and full point-to-point communications.

Features Plus

As standard, each model features forms width adjustment from 1.75 to 15.6 inches, shortest-distance sensing, full self-test, 700 character FIFO buffer (with an additional 2048 characters, optional), and a quick-change, 6 million character life ribbon.

Quality Plus

Beyond the built-in performance of the grafixPLUS series printers, the engineered-in quality and support are equally important. The result? Approval of both UL and FCC, Class A; operating noise levels under 65dbA; and a nationwide service organization second to none.

To see for yourself why the grafixPLUS printers offer more pluses for your printing dollar, contact us today.

 **Anadex**
the plus in printers

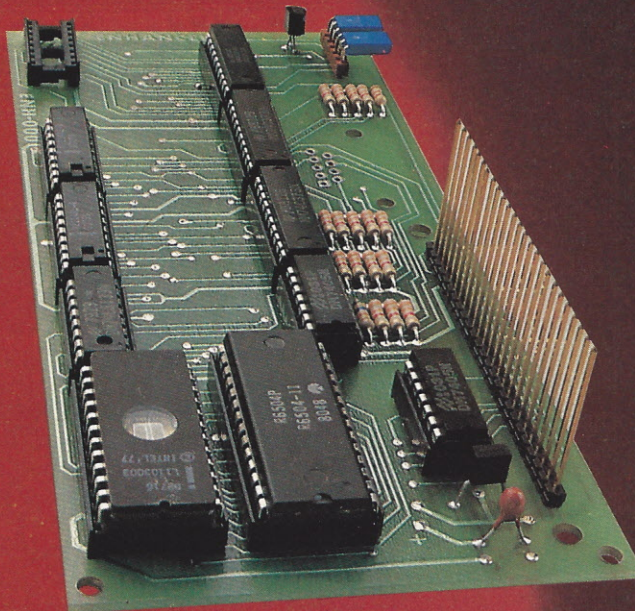
Made in
U.S.A.
for the World

ANADEx, INC. • 9825 DeSoto Avenue • Chatsworth, California 91311, U.S.A. • Telephone: (213) 998-8010 • TWX 910-494-2761
U.S. SALES OFFICES, San Jose, CA (408) 247-3933 • Irvine, CA (714) 557-0457 • Wakefield, MA (617) 245-9160 • Austin, TX (512) 327-5250
ANADEx, LTD. • Weaver House, Station Road • Hook, Basingstoke, Hants RG27 9JY, England • Tel: Hook (025672) 3401 • Telex: 858762 ANADEx G

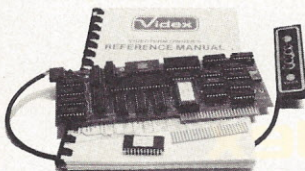
THE DAWN OF A NEW ERA FOR APPLE II: THE ENHANCER II

Introducing the Enhancer II: a new Standard which is improving the relationship between Humans and Apples. The Enhancer II can help your Apple II's keyboard become more sociable by remembering words or phrases which can be entered into the Apple by the mere touch of a key. Life can become even easier because the Enhancer II can remember what you typed while your Apple was busy talking to your disc (or doing other things). Naturally, it knows the difference between upper and lower case letters and what shift keys are supposed to do. It even knows to auto repeat any key held down. The Enhancer II replaces the encoder board making installation simple.

Suggested retail price: \$149.00.



■ VIDEOTERM



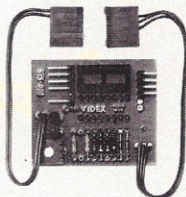
The time tested Videoterm 80 column card:

- 80 characters x 24 lines
 - True decoders
 - 7 x 9 character resolution
 - Low power consumption
 - Compatible with most word processors
 - Softcard and CP/M compatible
 - Modem compatible
 - Most popular character set of any 80 column card
 - Alternate character fonts available
- Suggested retail price \$345.00

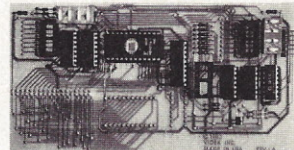
■ SOFT VIDEO SWITCH

The Soft Video Switch is an automatic version of the popular Switch-plate. It knows

whether it should display 40 or 80 columns or Apple graphics. It does the tedious work of switching video-out signals so you don't have to. The Soft Video Switch can be controlled by software. Any Videoterm with Firmware 2.0 or greater may be used with the Soft Video Switch. The single wire shift mod is also supported. Package price is \$35.00.



■ KEYBOARD AND DISPLAY ENHANCER



The original Keyboard and Display Enhancer is still available for Revision 0-6 Apples (on which the new Enhancer II will not fit). These Apples have memory select sockets at chip locations D1, E1 & F1. The Keyboard and Display Enhancer allows entry and display of upper & lower case letters with fully functional shift keys. It does NOT have user definable keys nor a type ahead buffer. The price is \$129.00.

■ ACCESSORIES:

Videoterm Utilities Disc \$37.00 (includes)

- Font Editor
 - Pascal Mid-Res Graphics
 - Applesoft Read Screen Utility
 - Top & Bottom Scrolling
 - Pascal Vidpatch
 - Graphics Template
- Character Set EPROMs \$29.00 ea
- Half Intensity
 - Inverse
 - German
 - Katakana (Japanese)
 - Line Drawing Graphics (Expanded)
 - Spanish
 - French
 - Math & Greek Symbols
 - Super & Subscript

Dvorak EPROM (Enhancer) \$29.00
Lower Case Chip \$29.00

BOOK REVIEWS

puters: "It is only a matter of time before television sets incorporating microprocessors begin to be produced. These sets will be able to do double duty as home computers and as viewdata terminals, thus considerably extending the possibilities of Videotext itself."

The termination of terminology terror

COMPUTER DICTIONARY FOR EVERYONE

DONALD D. SPENCER
CHARLES SCRIBNER'S SONS
190 pp., \$5.95

During a trip to MONTE CARLO, PLATO and SAM agreed that there is nothing JOVIAL about the way people toss computer terms around like SNOBOLS on a winter afternoon. Now, with Donald Spencer's *Computer Dictionary for Everyone*, there is no excuse for misusing, or generally abusing, computer terminology.

The key to the *Computer Dictionary* is simplicity. It defines only about 2500 of the most commonly used computer words, and does not overwhelm the user with thousands of obscure terms. Each word is defined precisely and concisely in plain, non-technical language. In the few cases where technical terms are unavoidable, Spencer defines those words and provides a comprehensive cross-referencing system for easier use.

The book also defines almost every acronym a computer user will ever come across, including: CRAM—"Card Random Access Method. An auxiliary storage device that uses magnetic cards, each of which is capable of storing data in magnetic form." LIFO—"Last In First Out, the way most microprocessor program stacks operate. The last data or instruction word placed on the stack is the first to be retrieved." 

Turn your TV into a time-sharing videotex display for \$399.*

Now you can connect your family to the informative and entertaining world of CompuServe, The Source, Dow Jones News/Retrieval and other time-sharing and data-base networks.

All you need is the RCA VP-3501 Videotex Data Terminal (with built-in modem and RF modulator), your telephone and your TV set. You can get instant access to regional newspapers and newsletters...weather reports and sports results...computer games and more. You can use the VP-3501 to make airline reservations...find restaurant recommendations in cities around the world. Plus stock market and corporate data. Or access your school or business computer. You can even send electronic mail and buy products.

In addition to information retrieval, the VP-3501 provides full interactive communications with a host computer. What you have working for you is a versatile, feature-packed interactive data terminal which can be worth far more to you than its low price. Its unique color-locking circuitry gives you sharp color graphics and rainbow-free characters. You get 20- and 40-character formats in one of eight foreground colors and separate color backgrounds.

With reverse video, you can emphasize certain letters, words, or sentences. A built-in tone generator...plus a white noise generator...let you create everything from the sound of explosions to the sound of music. The spill-proof, easy-to-clean keyboard is highly suitable for hostile environments. And its membrane key switches give you a natural feel.

The VP-3501 is truly a fine Videotex Data Terminal. And don't forget, it's made by RCA...the first name in television...now the foremost name in videotex terminals.

See a demonstration at your computer or electronics dealer, or contact RCA. Order now and you'll get a free password and a free hour's time-sharing on both CompuServe and Dow Jones News/Retrieval! (Limited time offer.)

For more information or to order, call toll-free. 800-233-0094. (In Pennsylvania, call 717-393-0446.) Visa or MasterCard orders accepted by phone. Or send a check including \$3.00 delivery charge plus your local sales tax to RCA MicroComputer Products, New Holland Avenue, Lancaster, PA 17604.

*Suggested User Price.



Introducing Something New In
Apple Data Base Systems

Choice



Good, Great and Super

There are some pretty good Apple data base systems out there. DB Master and PFS for example. Not good enough, however, because you take what they give you which is usually too much or too little.

Now STC, the company that introduced simplicity to small computers, brings you three versions of its highly successful IFO™ data base package. Three different levels of capability at three different prices. You get what you pay for and you get a lot.

Good. — IFO Version I

Version I is our proven low-cost package. It organizes information files and manipulates them. Very flexible report formats. Version I will satisfy most users for such jobs as client listings, inventories, real estate data, employee records, patient profiles, membership rosters, etc. The price is also very satisfying. **\$120.**

Great. — IFO Version II

Version II employs two drives. This means larger on-line file capacity faster access to information and more flexible reporting capabilities. It also incorporates the Soundex data retrieval capability. What's more, Version II supports the 80-column board, lower case and the Epson printer—to our knowledge, no one else does. Version II is indeed great. At a great price. **\$200.**

Super. — IFO Version III

Version III is designed for the CORVUS hard disk, hence offers far more capacity and far faster access than diskette-based systems. Version III also employs the Soundex system. Like Version II, it supports the 80-column board, lower case and the Epson printer, plus much more. The price is also super. **\$450.**

It's Easy to Use

You can create a database and start entering data into it in less than two minutes.

It can be set up so that even the untrained person can accurately run even your most complicated application.

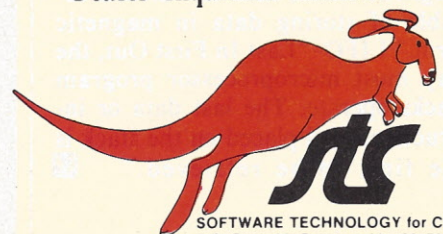
If your application calls for managing data, then one of our IFO family of DBMS programs is the answer.

And remember, unlike other systems, IFO doesn't make you change the way you do business, we only make it easier and quicker.

FOR MORE INFORMATION

We'll be happy to direct you to your local STC dealer. Just write or call us.

Dealer Inquiries Invited.



SOFTWARE TECHNOLOGY for COMPUTERS
P.O. Box 428, Belmont, Ma 02178
(617) 923-4334

Apple is a trademark of Apple Computer Company.
IFO (Information File Organizer) is a trademark of Software Technology for Computers.

OUTLOOK

SOFTWARE SCARCITY

(continued from page 21)

president of Hartley Data systems in Glenview, Ill.

Koolish attributes the need for information to a number of converging trends. First, by 1984, the installed base of small-business computers is expected to reach 3.5 million—compared to the 1977 installed base of 88,000. Secondly, rapidly dropping hardware prices are luring first-time users into the small-business-systems market, as well as luring the large dp users into distributed data processing with small-business computers. Finally, software advances have not kept pace with hardware advances. Even programs provided by leading suppliers of small-business systems need to be rewritten or upgraded. Yet these vendors do not have the support staff to do so. While large dp sites have the personnel and budget to produce and maintain custom software, users of small-business computers must look for friendly software that can easily be used by non-dp professionals.

"Our clients kept asking us where they can turn for reliable software. Assuming that the problem is probably universal, we jumped into our first publishing venture and are now issuing the first edition of *The Small Systems Software and Services Sourcebook*," Koolish says.

The book concentrates on fulfilling the needs of the small-business-systems user. The 500 plus page *Sourcebook* lists more than 1300 statistical programs, business applications, legal, accounting, report generators, program development aids, file managers and word-processing programs. Each listing contains keywords for quick scanning; clear, nontechnical descriptions of the software; hardware, operating systems and languages; availability, terms price, number of installations, documentation and training; and address, phone and contact name of the vendor.

A one-year subscription to *The Sourcebook* costs \$125 including the Spring 1982 supplement. Further information can be obtained by contacting Ruth Koolish, Information Sources, Inc., 1807 Glenview Rd., Glenview, IL 60025; (312) 724-9285.

COMPUTER PRICES COMING DOWN

When automobiles were first available, many people kept walking. This wasn't because they necessarily chose to, but rather, they couldn't afford not to.

Now there's good news for people who still suffer from cramped necks and paralyzed hands from working with pencils, paper and calculators. If they're still walking through their business and home chores because they couldn't afford to ride the personal-computer wave, they may be able to ride now. Hewlett-Packard, Altos Computer Systems and Datamac have recently announced price reductions on their personal-computer systems.

Many factors are causing the reduction of prices—competition with the rest of the manufacturers in the

TERMINALS FROM TRANSNET

PURCHASE PLAN • 12-24 MONTH FULL OWNERSHIP PLAN • 36 MONTH LEASE PLAN

DESCRIPTION	PURCHASE PRICE	PER MONTH		
		12 MOS.	24 MOS.	36 MOS.
DEC				
LA36 DECwriter II	\$1,095	\$105	\$58	\$40
LA34 DECwriter IV	995	95	53	36
LA34 DECwriter IV Forms Ctrl.	1,095	105	58	40
LA120 DECwriter III KSR	2,295	220	122	83
LA120 DECwriter III RO	2,095	200	112	75
VT100 CRT DECscope	1,695	162	90	61
VT101 CRT DECscope	1,195	115	67	43
VT125 CRT Graphics	3,295	315	185	119
VT131 CRT DECscope	1,745	167	98	63
VT132 CRT DECscope	1,995	190	106	72
VT18XAC Personal Computer Option	2,395	230	128	86
TEXAS INSTRUMENTS				
TI745 Portable Terminal	1,595	153	85	58
TI765 Bubble Memory Terminal	2,595	249	138	93
TI Insight 10 Terminal	695	67	37	25
TI785 Portable KSR, 120 CPS	2,395	230	128	86
TI787 Portable KSR, 120 CPS	2,845	273	152	102
TI810 RO Printer	1,695	162	90	61
TI820 KSR Printer	2,195	211	117	80
LEAR SIEGLER				
ADM3A CRT Terminal	595	57	34	22
ADM5 CRT Terminal	645	62	36	24
ADM32 CRT Terminal	1,165	112	65	42
ADM42 CRT Terminal	1,995	190	106	72
DATAMEDIA				
EXCEL 12 CRT Terminal	1,695	162	90	61
EXCEL 42 Smart Buffered CRT	995	96	54	36
COLORSCAN 10 Color CRT	3,195	307	171	116
TELEVIDEO				
925 CRT Terminal	850	82	46	31
950 CRT Terminal	1,075	103	57	39
NEC SPINWRITER				
Letter Quality, 7715 RO	2,895	278	154	104
Letter Quality, 7725 KSR	3,295	316	175	119
GENERAL ELECTRIC				
2030 KSR Printer 30 CPS	1,195	115	67	43
2120 KSR Printer 120 CPS	2,195	211	117	80
HAZELTINE				
Executive 80/20	1,345	127	75	49
Executive 80/30	1,695	162	90	61
EPSON				
MX-80 F/T Printer	745	71	42	27
MX-100 Printer	895	86	48	32
TIMEPLEX				
E0400 4 Channel Stat Mux	1,525	147	82	55
E0800 8 Channel Stat Mux	2,050	197	110	74

FULL OWNERSHIP AFTER 12 OR 24 MONTHS • 10% PURCHASE OPTION AFTER 36 MONTHS

MICROCOMPUTERS

APPLE • COMMODORE • HP85 • DEC LSI 11

ACCESSORIES AND PERIPHERAL EQUIPMENT

AUDIO COUPLERS • MODEMS • THERMAL PAPER • RIBBONS • INTERFACE MODULES • FLOPPY DISK UNITS



TRANSNET CORPORATION

1945 ROUTE 22 • UNION, N.J. 07083 • (201) 688-7800
TWX 710-985-5485 800-526-4965 OUTSIDE N.J.

CIRCLE 64

WE ACCEPT TAX REFUNDS



SPEND YOUR TAX DOLLARS WITH US. WE SPECIALIZE IN QUALITY APPLE SOFTWARE FOR THE:

- | | |
|-------------------------|----------------------------|
| A. Doctor | G. Attorney |
| B. Dentist | H. Stock Broker |
| C. Student & Teacher | I. Accountant |
| D. School Administrator | J. For novice programmers, |
| E. Secretary | try our teaching programs |
| F. Construction Worker | in BASIC. |

We also accept checks, Visa and Mastercard.

Call TOLL FREE for Complimentary Brochure:
(800) 854-0561 In CA (800) 432-7257 Ext.802

For further information call (714) 365-6668

monument COMPUTER SERVICE

Village Data Center - P.O. Box 603 - Joshua Tree, CA 92252

CIRCLE 104

April 1982 PERSONAL COMPUTING 125

INVENTORY CLEARANCE SALE! SALE! SALE! SALE!

CRT's • PRINTERS • TELEPRINTERS

Beehives B-100	\$330.00
T.I. 725 Portable	\$550.00
T.I. 735 Portable	\$770.00
T.I. 733 KSR	\$825.00
T.I. 733 ASR	\$1320.00
T.I. 755 RO	\$440.00
T.I. 765	\$2200.00
T.I. 810 FLC	\$1485.00
T.I. 810 FLC-CP	\$1568.00
DEC LA 36	\$825.00
Lear Siegler CRT ADM 42	\$1315.00
Soroc CRT IQ 120 Blockmode & Printer port	\$715.00
NEW! Soroc CRT IQ 140	\$999.00 NEW!
NEW! Anadex DP-8000AP 230V	\$700.00 NEW!
NEW! Anadex DP-9500/9501	\$1099.00 NEW!
NEW! TeleVideo CRT 912B	\$743.00 NEW!
NEW! GTC (Infoton) 1/101 CRT	\$825.00 NEW!
NEW! TEC 511 CRT	\$550.00 NEW!
NEW! DEC LA 34DA	\$825.00 NEW!
NEW! EXIDY Sorcerer (32K), EXP. INT., W/p PAK, dual disk, DOS Basic, plus monitor	\$1500.00 NEW!

*T.I. terminal options 50% OFF!

... other major manufacturers up to 40% OFF!

LIMITED QUANTITIES AVAILABLE!

Call Marla (714) 832-2426

Terminal Rentals, Inc.

2722 WALNUT AVENUE, TUSTIN, CALIFORNIA 92680

CIRCLE 125



Hardware Spool!

CUE is a communications processor which rapidly accepts from your computer data to be printed and then goes off-line to drive the printer—-independent of your computer, which is now free. CUE is better than software spooling since none of your computer's memory, processing power, or disk drives are tied up. CUE is available in parallel, serial, or with both in 2- and 4-port models (connect several printers or computers) with from 16K to 32 K memory. Use as an interface

Prices begin at \$299.



MicroCompatible

(404) 874-8366

151 6th St., P.O. Box 7624, Atlanta, GA 30357

CIRCLE 89

OUTLOOK

field, lower manufacturing costs through advanced automation processes, lower priced components, higher demand for product and new market entrants. And then there's also that factor indigenous to the electronics field: anticipation of the major Japanese market entrance—traditionally at the low end of the price scale.

Stephen Ruddock, a spokesman for Hewlett-Packard's Personal Computer Division, says, "The overall motivation for HP and other companies in the personal-computer business is to remain competitive and to make products more accessible to a larger audience and larger markets."

Hewlett-Packard's 15 percent price reduction of its HP-85 personal computer, says Ruddock, is due to specific manufacturing advances. The company has instituted a new, automated assembly process that increases the quality of the product and shortens manufacturing time. HP also has an improved, automated materials-handling system that cuts costs and time.

Taking another standpoint, David Witkowski, Altos Computer Systems' director of product marketing, attributes the recent price reductions to "the reduction in the cost of the components that are going into the systems. In other words, as the volume of the systems sold goes up, component's prices come down.

"When there is a major price reduction in components, we have to reduce our price to reflect it. Otherwise, somebody else is going to come in and try to take our market at a lower price," Witkowski says. "We try to head that off by keeping our prices as low and as aggressive as possible."

But there are other reasons for the recent price reductions. Robert Lindgren, Datamac's vice president of sales, says that his company has two reasons for reducing the prices of its products: "One is that the manufacturing costs are coming down, and the other is to keep us in more of a competitive price position."

As the personal-computing market matures and companies find new ways to manufacture their products, the costs to the consumer will go even lower than they are today. "The market is sensitive to price. As the prices of personal computers continue to come down, they will be more and more affordable," Lindgren says. "We anticipate that, via price reductions, more people can afford to buy personal computers, especially in the tough financial times that we are in right now."

"The soft economy makes it more attractive to come out with low-priced machines," says HP's Ruddock. "If you look at the history of the computer industry from its inception 30 years ago, computers have been increasing in performance and coming down in price. The price reductions are a natural progression in the history of the computer business."

Witkowski of Altos feels that the personal-computing

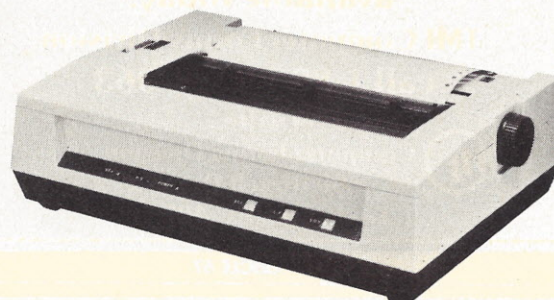
C. ITOH & ASAP

The Greatest Deal in Print

ASAP brings you the C.Itoh Pro/Writers and F-10 Printmaster. C.Itoh now gives you the latest performance and operator-oriented features as standard. With the quality and durability you've come to expect from C.Itoh printers. And now, you get all this at ASAP's low, low price. Compare the features. Then call ASAP to make your deal on a C.Itoh printer.

Pro/Writer and Pro/Writer II Low Profile Printers

These low profile printers provide professional, quality printing through a combination of high-speed matrix printing, logic seeking uni- and bidirectional printing, and quick return head motion. What's more, Pro/Writer and Pro/Writer II feature proportional spacing combined with excellent character resolution. Built-in graphics capability includes character generated and high resolution features.



Specifications

Number of columns

Print speed

Print width

Standard Interfaces

Serial

Parallel

High resolution graphics

144 x 160 positions per inch

Pro/Writer

80 column max.

120 cps

8" max.

EIA RS-232-C

& 20 mA current loop

TTL compatible, 7-bit

Standard

Pro/Writer II

136 std., 231 compressed

120 cps

13.6" max.

EIA RS-232-C

& 20 mA current loop

TTL compatible, 7-bit

Standard

F-10 Printmaster Daisy Wheel Printer

This high quality printer features a choice of 40 and 55 cps. Extensive word-processing functions have been built in to allow easy adaptability and reduced software complexity. Choice of friction feed or bidirectional tractor feed enables precise print positioning of tabular and graphics data.

Specifications:

Number of printable columns: 136, 163 variable

Return time: 900 mSec @40 cps; 500 mSec @55 cps

Line feed time: 40 mSec

Interface: 8-bit parallel, RS-232-C compatible, X-ON, X-OFF, 12-bit Qume and Diablo compatible.

asap
computer
products, inc.

1198 E. Willow St., Signal Hill, CA 90806

Toll free outside California:

(800) 421-7701

Inside California:

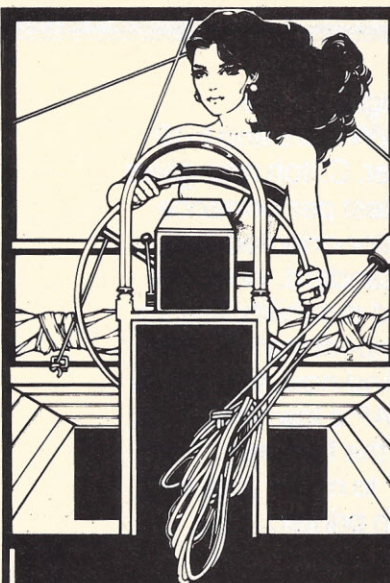
(213) 595-6431

(714) 891-2663

ASAP offers a 30-day buyer protection policy: full money-back guarantee if not totally satisfied.

Ordering information: name, address, phone; ship by: UPS or truck. Please call for shipping charges.

Terms: We accept cash, check, money orders, Visa and Master Charge (U.S. funds only). Tax: 6% Calif. res. COD's and terms available on approval (school, PO's accepted).



**You
have
better
things
to do
with your
money than
overspend
on
Computer
Paper!**

**Buy Direct and Save
The Best Prices and Values
available today!**

**TMI Computer Forms Division
call 1-800-354-9063**



or write:
**Computer Forms Division
680 Bizzell Drive
Lexington, Ky. 40504**

CIRCLE 67

Okidata Printers Make Good Computer Systems Better!

Okidata quality and reliability have been proven in thousands of computer room installations world wide. Don't settle for less! Okidata Slimline and Microline Series printers cover the full range from 80 CPS to 400 LPM—professional quality printers that produce professional looking copy and graphics.

Microline80	\$369.00
Microline82A	\$549.00
Microline83A	\$797.00
Microline84	\$1271.00
Slimline 125	\$CALL
Slimline 160	\$CALL
NEC5510 with tractor ...	\$2700.00

robec, inc.
Technology Center
Route 309
Montgomeryville
Pa. 18936

215-628-4960

Visa and Master Charge accepted

CIRCLE 107

OUTLOOK

market "is still a price-elastic market. If you reduce prices, you increase the overall size of your market. So I think the price reductions will continue to spur the market."

Ruddock also believes that the personal-computing market in general has been helped by the state of the economy in the United States. "Because budgets are smaller, people who may have been looking at a \$20,000 minicomputer are looking at personal computers for the first time. They are surprised that the capabilities of the personal computer are comparable to what they might expect in minicomputers."

But as the computer field grows larger and more crowded, it becomes even harder to predict when prices will stabilize. But there is one factor that is possibly in the back of every computer manufacturer's mind. Eventually, the Japanese are going to enter the market in full force.

Traditionally, the Japanese have entered markets at the low-end, as was the case in the calculator market. This may mean further price reductions to keep up with not only the American marketplace, but with the folks from the East.

BEE BITES AND BASIC

This summer junior-high and high-school age children can attend one week intensive BASIC training camps without enlisting with Uncle Sam. These BASIC camps will be held at Lake Forest College, 30 miles north of Chicago, and will involve basic training in personal computers, not war.

Our society is experiencing an information-processing revolution and more and more careers in business, education and the sciences require computer training. The purpose of these programs is to acquaint students with the world of computers. Absolutely no prior experience with computers is required. The program offers the student hands-on experience and is an excellent way to make a better informed career decision.

One personal computer will be provided for every two students and direct access to the computers will be maximized. Students will have at least nine hours of instruction, free time and game playing on the computer each day. In addition, a recreation hour will provide the participants the opportunity to swim, or play tennis or racquetball at the college's facilities.

The Director of the camps is Dr. Lowell Carmony, associate professor of mathematics and computer studies at Lake Forest College. Carmony has directed computer camps at Southern Illinois University in Carbondale during the summers of 1980 and 1981. He is also the chairperson of the Illinois Council of Teachers of Mathematics Task Force on Microcomputers in the Schools. He has

Apple Logo has arrived

*The sophisticated yet simple to use language
you have been reading about
is now available for your Apple II.[®]
Contact your Apple dealer today.*

logo
computer
systems inc.

222 Brunswick Blvd.
Pointe Claire, Que.
Canada
(514) 694-2885

989 Avenue of the Americas
New York, N.Y.
U.S.A.
(212) 564-6020

COMPUTER SUPPLIES



Send for your free copy today!

A Subsidiary of Wallace Computer Services, Inc.
3626 Stern Drive | 1615 S. Stockton St.
St. Charles, Illinois 60174 | Lodi, CA. 95241
CIRCLE 102

the
programmer's
program



CIRCLE 70

A collection of vintage computer software boxes and manuals for the 'Interactive Library' series. The items are arranged on a dark surface. Visible titles include 'World War II', 'World War III', 'The Great Escape', and 'The Great Escape II'. The boxes feature various illustrations, including historical scenes and action figures. Some boxes have 'Adventure' branding, such as 'Adventure in the Desert' and 'Adventure in the Jungle'. The manuals are white with black text and some illustrations. The overall aesthetic is that of early 1980s computer software packaging.

To stimulate the development of programs for its computers, Atari Inc. began the Atari Software Acquisition Program (ASAP) Contest in the spring of 1981. Cash and equipment prizes of \$100,000 are offered annu-

Ask your dealer for a demonstration



Chart your financial future with MicroFinesse™

In this fast-paced business world, the best way to stay competitive is to be able to see your financial alternatives clearly and make decisions fast.

That's why P-E Consulting Group Ltd. developed MicroFinesse, a complete package providing professional financial forecasting PLUS full high-resolution color graphics support, including pie charts, histograms and graphs, for the financial projections you create.

Now this evolutionary financial resource planning tool eliminates the time-consuming reprogramming required for financial model

consolidation or expansion. MicroFinesse's menu-driven command format can also generate up to 15 user-defined reports per model, with visuals, without reprogramming.

Previously available only for main-frame applications, the MicroFinesse program can now be purchased at

leading Dealers nation-wide. MicroFinesse is specifically designed for the 48K Apple II® with the Apple Language Card.

So when your variables are many and your time is limited, take a good look at the financial artistry of MicroFinesse.



MicroFinesse

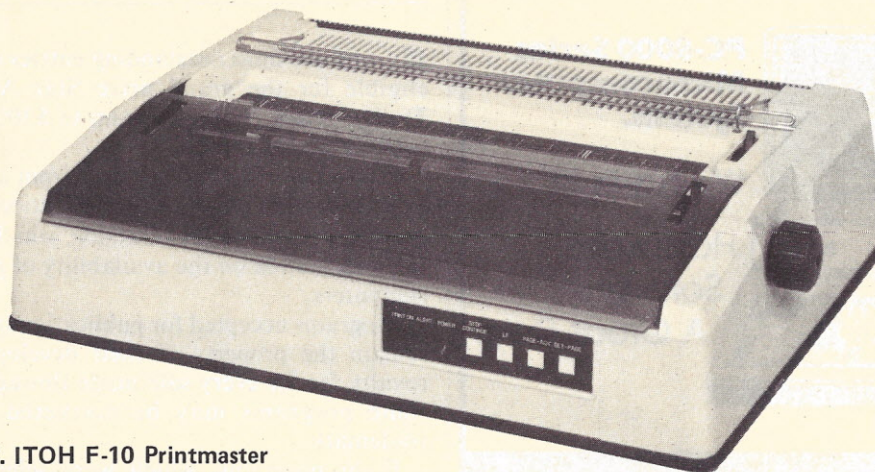
Distributed by:  **OSBORNE/McGraw-Hill**
630 Bancroft Way, Berkeley, CA 94710, (415) 548-2805

Apple II is a registered trademark of Apple Computer, Inc.

CIRCLE 91



\$1295 for a 40 CPS Word Processing Printer ?



C. ITOH F-10 Printmaster
40 CPS Daisy Wheel Printer

IS THIS THE C. ITOH STARWRITER III?

The C. ITOH F-10 Printer is manufactured by Tokyo Electric Co., Ltd., (TEC), the same company that made the 25 CPS Starwriter I, and the 45 CPS Starwriter II, and you may even see other people calling it the Starwriter III, TEC 40 CPS, or just simply C. ITOH 40 CPS Printer. By any name this may be the best word processing printer value on the market today. When you compare the standard features with any printer on the market today, we think you will agree.

INDUSTRY STANDARD FEATURES

Plug compatible with **Diablo**, **Qume**, and **NEC** Printers. Uses standard 96 character plastic print wheels, and the new dual-plastic print wheels that, unlike metal wheels, provide superior print quality over the entire print life of the wheel. Software control characters that are standard for all major word processing packages.

CONSTRUCTION

Built on a cast aluminum base with high quality metal parts, the unit stands just 6" high, yet will feed paper from the bottom as well as the rear. The solid construction makes the unit low noise and ideal for office or home.

INTERFACE

RS 232-C interface with XON/OFF and ETX/ACK protocols. Baud rate selectable to 1200 Baud.

APPLICATIONS

Compatible for use with **Apple**, **Radio Shack**, **IBM**, **NEC**, **Xerox**, **Vector Graphics**, **North Star**, **Altos**, etc.

OPTIONS

Bi-directional tractor feed, printer stand.

SPECIFICATIONS

Print Speed	40 CPS
Character Spacing	1/120" (minimum)
Line Spacing	1/48" (minimum)
Paper Width	16" (maximum)
Print Wheel	Industry standard 96 character wheel
Ribbon	Multi-strike, or fabric cassette
Interface	RS 232-C
Dimensions	22.5"W x 15.9"D x 6"H
Weight	30.8 pounds
Power Requirements	115V±10%, 50/60 Hz, 70W
Reliability Data	MTBF is 1year with a 75% duty cycle

WARRANTY

90 day factory warranty. We pay shipping both ways.

SATISFACTION GUARANTEED

If, for any reason, you are not satisfied, you may return the unit to us within 30 days for a full refund.

SHIPPED BY UPS

Prepaid or COD by money order or cashiers check.

Prices quoted are for stock on hand and are subject to change without notice.

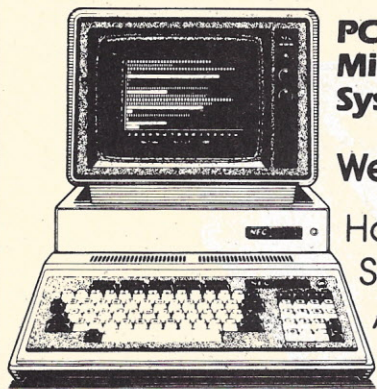
Write Writer, inc.

1703 Stewart Street, Santa Monica, CA 90404

TO ORDER OR FOR INFORMATION, CALL:
(213) 829-6871

Your Computer Should Come
from a Multi-Billion Dollar
Company with Three Initials

NEC



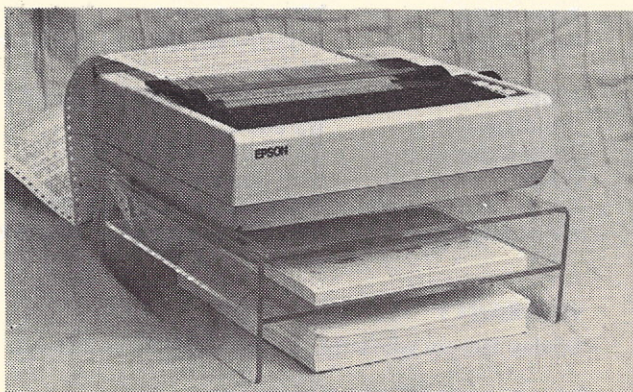
**PC-8000 Series
Microcomputer
System.**

We have It!

**Hardware
Software
A Great Deal**

**SYNAPSE VIDEO
P.O. Box 962
New York, New York 10009
(212) 860-5776**

CIRCLE 46



Printer Stand

End the paper mess from your desk-top printer. Paper is fed from under the printer for easy stacking. Extra shelf (SHOWN ABOVE) is available for easy forms storage.

Regular	(300010)	\$29.95
Regular w/shelf	(300011)	\$44.95
Large	(300020)	\$34.95
Large w/shelf	(300021)	\$49.95

EPSON RIBBON RELOADS

Reload your MX-70/80/100 with new Black, Red or Blue ribbon. These Silver Dollar loops are loaded into your old cartridge saving you money. Ribbons fit in both MX-70/80 and MX-100 Carts.

Black	(500000)	\$3.95 ea.	Black	(500001)	\$39.50 dz.
Red	(500010)	\$4.95 ea.	Red	(500011)	\$49.95 dz.
Blue	(500020)	\$4.95 ea.	Blue	(500021)	\$49.95 dz.
MX-70/80 Ribbon Cartridge	New	(500050)			\$10.95 ea.
MX-70/80 Ribbon Cartridge	New	(500051)			\$29.95 pk.



B.T. Enterprises
171 Hawkins Road
Centereach, New York
(516) 981-8568 (Voice)
(516) 588-5836 (Data)
MNET-70331, 105

Add \$2.00 S & H. NYS res. add appr. tax



CIRCLE 99

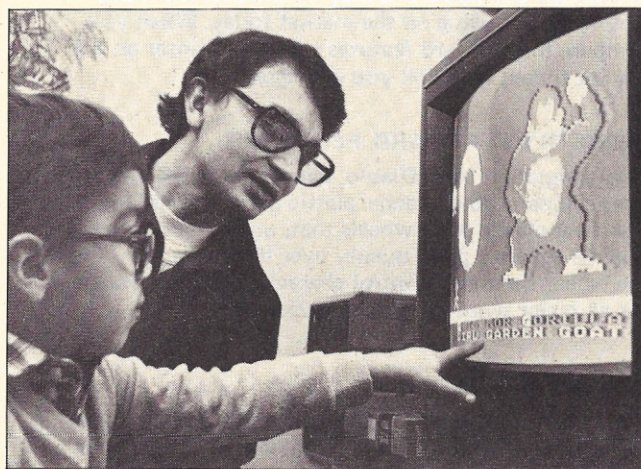
OUTLOOK

ally, and the most outstanding entries of the year become eligible for the grand prize Star Award of \$25,000. Twelve prizes, with values up to \$3000, are awarded in each quarterly contest.

Contest winners are selected from among those whose programs were chosen for publication in the Atari Program Exchange (APX) Catalog, which is used to distribute information on the availability of programs for Atari computers.

Programs accepted for publication in the APX Catalog remain the property of their developers. Atari pays a royalty fee for every sale made through the catalog, and some programs may be marketed under the Atari trademark.

Eight programs, which were selected for the APX Catalog and earned quarterly awards, were in the final judging for the 1981 grand prize. Three of these received Awards of Merit. The Star Award winner was Fernando Herrera of Elmhurst, N.Y., who submitted My First Alphabet, an educational computer program that coaches preschool and elementary school students through a basic study of letters and numerals. The program teaches through the use of graphics, and offers widespread bene-



Atari's \$25,000 award winner looks on as a youngster gives his educational program a try-out.

fits as an educational tool in early childhood education, Atari says.

Herrera, formerly an architect and industrial designer, is now a computer store manager. This was his first attempt at programming, a skill he taught himself.

Greg Christensen, an 18-year-old freshman at Fullerton College in Calif., created Caverns of Mars, a computer game that earned first prize in the winter ASAP Contest. The game pits the player against a Martian enemy in a battle that takes place from the surface of Mars to subterranean caverns. This was Christensen's

INTRODUCING CALCSTAR.TM ANOTHER INDISPENSABLE BUSINESS PROGRAM FROM MICROPRO,TM THE WORDSTARTM PEOPLE.

CalcStar software eliminates the need to use ledger paper ever again. It turns your video screen into a "window" on a giant electronic ledger sheet, with up to 600 entries arranged the way you want. Then, by inserting formulas into CalcStar, you create financial models that simulate the future numerically. And predict the outcomes of your business decisions.

When you notice what CalcStar can do for your business, you'll wonder how you ever got along without it. (If you're now a WordStar user, you probably already know the feeling.)

The MicroPro bonus. Like WordStar, CalcStar is packed with innovative features that make it versatile and easy to use. Features like Automatic Forms Mode, which lets an inexperienced user enter data into a spread sheet quickly and with less chance of error.

CalcStar's greatest innovation is its ability to join with WordStar. Which means, for example, you can use WordStar's printing options, like boldface and underlining, to dress up financial documents. And you can insert sections of CalcStar's spread sheets into your WordStar documents.

This kind of flexibility should come as no surprise if you're already familiar with the MicroPro software family — a line of programs designed to work together to multiply your problem-solving power. Visit your MicroPro dealer to find out just how big a difference *all* our products can make in your business. We predict you'll discover it's not just CalcStar or WordStar that's indispensable. It's MicroPro.

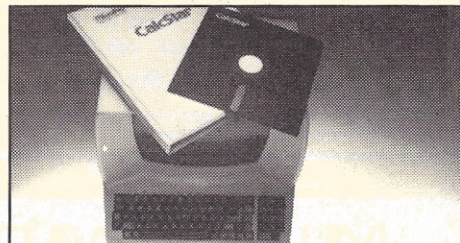
Presenting CalcStar — another standard-setting software product in the WordStar tradition.

CalcStar is MicroPro's new electronic spread sheet and financial modeling program — a sophisticated, yet easy to use, calculating and planning tool for CP/M®-based computers.

The ultimate electronic spread sheet.

CalcStar calculates solutions to complex numerical problems in business and finance. Helps you make budget plans and sales forecasts with greater speed and accuracy. And projects figures into the future to answer the "what if" questions you face in business.

And CalcStar also has a unique MicroPro advantage: It joins with WordStar to combine spread-sheet and word-processing capabilities in several powerful ways.



A glance at CalcStar features

Runs on CP/M version 2.0 or above, with 80-column screen, addressable cursor, and at least 48K memory. 56K or more is recommended for fullest utilization.

Highly user friendly: Call up full screen of help or use help menu. WordStar-like cursor commands. User's guide shows you the basics. Install from menu OR a WordStar file.

Stores formulas and formats along with data, for convenience and less chance of error.

Math functions include average, minimum, maximum, logarithms, exponents, and regression analysis.

SOFTWARE
THAT MEANS BUSINESSTM

MicroProTM

INTERNATIONAL CORPORATION

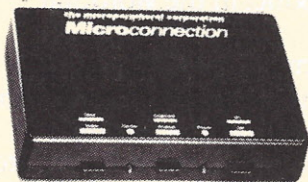
1299 Fourth Street, San Rafael, California 94901
(415) 457-8990; Telex: 340-388

CP/M is a trademark of Digital Research, Inc.
Dealer and distributor inquiries invited.



GOOD CONNECTIONS

Autodial/Autoanswer Modems



The MICROCONNECTION™ direct connect modem automatically dials other computers and answers too. It monitors incoming lines, runs printers, decodes busses and transcribes incoming data. Excellent terminal and host software. Available for RS-232, TRS-80, TRS-80 Color*, Apple*, Atari 400/800*, and CBM/PET*. \$224.95 up

the microperipheral corporation

2643 - 151st Pl. N.E.
Redmond, WA 98052
(206) 881-7544

*Trademarks of Tandy Corp., Apple Corp., Atari Corp., and Commodore Business Machines.



CIRCLE 88

MICROMAIL™

CRT'S • PRINTERS • TELEPRINTERS

★NEW★
C. ITOH 8510
PRINTER
\$499.00

★SAVE★
TEC 511
CRT
\$499.00

★LOW★
Letter Quality
DIABLO 630
\$1950.00

CALL FOR OUR LOW PRICES ON

**NEC, QUME, ANADEx,
TELEVIDEO, DEC, T.I.,
TELETYPE, SOROC, C.ITOH**

TOLL FREE (800) 854-6028

SAVE ON
PREPAID
ORDERS

MASTER CARD
VISA
ACCEPTED

C.O.D
REQUIRES
15% DEPOSIT

**FOR ORDERING
INFORMATION
PLEASE CALL**

MICROMAIL
P.O. Box 3297
Santa Ana, CA 92703
Phone: 714/731-4338
TWX: 910 595 1146

CIRCLE 82

OUTLOOK

first "serious" attempt at developing a computer game. This program will become a standard Atari Computer product.

Ronald Marcuse, a data-processing manager, and his wife Lynn, a computer-science student, have earned a total of three prizes in Atari quarterly contests, including a first place prize in the fall contest for their Data-Management System. This program provides users with a computer file for cataloging records, tapes and books; and information such as telephone and address records. The Freehold, N.J. couple are veteran programmers with more than 400 household programs to their credit.

In making the first annual Star Award to Herrera, Bruce W. Irvine, vice president of software at Atari's Home Computer Division, says "We designed the ASAP contest to provide some tangible incentive for computer programmers and hobbyists to create software that would enhance the benefit of our computer systems to the ever-growing body of users. We have focused ASAP's efforts on programming for personal finance and household management, self-improvement, education and home entertainment. These are the areas that will make the personal computer a valuable tool for virtually every home."

COMPUTERS IN THE FINAL FRONTIER

In the past year, the Kennedy Space Center in Florida has launched 18 Commodore computer systems into service for NASA. Budget cutbacks have encouraged the agency to bring in personal computers where they might have used more expensive minicomputers before.

Some of the computers are used with WordPro word-processing software from Professional Software in Needham, Mass. Others are used with Jinsam 8.0 from Jini Micro Systems in Riverdale, N.Y., for data-base management and decision support.

Martha Barnes, a secretary at the Space Center's Cargo Operations office, tried to convince her boss that she would be more efficient if he got her a fancy word-processing system, like the ones she had seen elsewhere at the center. She felt a word processor would be perfect for sending out personalized form letters and meeting government regulations.

A local computer dealer, Otis Lutz, had been dealing with the Space Center, and one day he appeared at Barnes' desk with a Commodore computer, disk drive, printer and WordPro. He claimed that this system would do everything the expensive systems would do.

Now, over a year later, Cargo Operations has seven of these systems shared by 15 users. Using them for repetitive typing chores, the section has benefitted from having the low-cost systems, because typing doesn't have to be sent out to expensive dedicated word processors.

But decision support provided the real challenge.

(continued on page 140)

ORANGE MICRO JUST TURNED A PAGE IN PRINTER HISTORY.



**OUR PRICES, SELECTION & SAME-DAY SHIPPING MAKE US COMPETITIVE.
OUR PEOPLE MAKE US EXPERTS.**

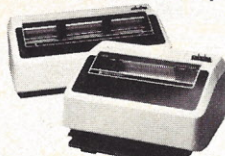
NEC 8023 Outstanding Graphics, Print Quality & Performance



144 x 160 dots/inch • Proportional Spacing
• Lower case descenders • Nx9 dot matrix
• 8 character sizes • 5 unique alphabets
• Greek character set • Graphic symbols
• 100 CPS print speed • Bi-directional logic-seeking • Adjustable tractors • Single-sheet friction feed • Vertical & horizontal tabbing

NEC 8023
Dot Matrix List \$795 **\$Call**

IDS Paper Tiger 560/Prism 80/132 Affordable Color, Speed



Dot Resolution Graphics • 9-wire staggered printhead • Lowercase descenders • Over 150 CPS • Bi-directional, logic-seeking • 8 character sizes • 80-132 columns • Hi-res dot graphics • Proportional spacing • Text justifications

Prism 80 List \$899 **\$700**
IDS Paper Tiger 560G List \$1395 **\$1100**
Prism 132 (Color) List \$1995 **\$1895**

NEC Spinwriter 7700 & 3500 Daisy Wheel Quality Leader



High speed, letter quality • 55/33 CPS
• Typewriter quality • Bi-directional plotting & proportional spacing • Quiet • OCR quality print • Hi-res plotting/graphing • Quick change ribbon • Optional cut-sheet feeder, horizontal or bidirectional tractors • Prints up to 8 copies.

NEC Spinwriter RO
Serial Parallel 77xx List \$3055 **\$2575**
35xx List \$2290 **\$1975**

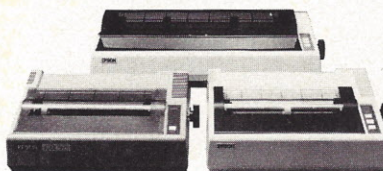
Televideo CRT's Price, Performance & Reliability

910C List \$699 **\$600**
920C List \$995 **\$770**
925C List \$995 **\$750**
950 List \$1195 **\$970**

Other quality printers at Red Baron

	List	Discount
C. Itoh 8510 Prowriter	\$795	\$650
C. Itoh Starwriter	\$1895	\$1525
Diablo 680/6	\$2995	\$2570
QUME Sprint 9/45	\$2475	\$2150

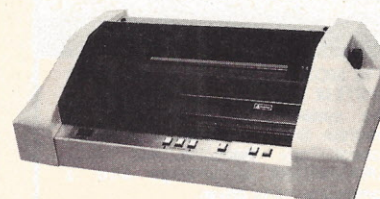
The Epson Series. High-Quality Printers at a Low Price.



Epson MX70 List \$450
Epson MX80 List \$645
Epson MX80FT List \$745
MX100 List \$945 **\$Call**

Full Line of Epson Accessories

Anadex 9501 High Speed, Commercial Duty Plus Graphics



Dot graphics • Wide carriage • 11 x 9 dot matrix • Lower case descender • Dot resolution graphics • Bi-directional, logic seeking • Up to 200 CPS • RS 232 Serial & Parallel • Forms control • X-On/X-Off • Up to 6 part copy

Anadex 9501 List \$1650 **\$1350**

INTERFACE EQUIPMENT

Complete stock of options, cables and accessories.

GRAPPLER APPLE INTERFACE **\$175**
CCS APPLE SERIAL Interface & Cable **\$150**
ORANGE INTERFACE for Apple II
Parallel Interface Board and Cable **\$110**
NOVATION D-CAT
direct connect modem **\$180**
COMPLETE STOCK OF EPSON
ACCESSORIES **\$Call**
CUSTOM PRINTER CABLES FOR Apple,
Atari, IBM, TRS-80 (all models) **\$Call**
HAYES MICROMODEM **\$300**
PRINTER STANDS: Large **\$99**
Small **\$25**
PRINTER RIBBONS—Most Types **\$Call**

Our People, Our Product: Both Are Specialized.

Red Baron is an organization of computer printer specialists. They know the capabilities of each printer, and how to match one to your exact need. Call for expert consultation today!

Here's how to order.

Phone orders are welcome; same-day shipment on orders placed before 11:00 a.m. Free use of MasterCard and Visa. CODs accepted. Personal checks require 2 weeks clearance. Manufacturer's warranty included on all equipment. Prices subject to revision.

Orange Micro Retail Stores

Sherman Oaks: 13604 Ventura Blvd. (213) 501-3486
Anaheim: 3150 La Palma, #1 (714) 630-3622
Santa Clara: 3216 Scott Blvd. (408) 980-1213



**CALL FOR FREE CATALOG
(800) 854-8275**

CA, AK, HI (714) 630-3322.



1100 N. TUSTIN
ANAHEIM, CA 92806

WORD PROCESSING SOFTWARE

The Newest, Easiest to Use, Low-Cost Word Processor Available for the Apple II™

The word processor you choose should be powerful, yet simple to use. It should have the features of expensive word processors, and still be reasonably priced. And it should be able to run on any Apple II computer without requiring you to spend a few hundred dollars to buy additional hardware to make the program compatible with the computer.

The word processor that best meets these requirements is Hayden's new PIE Writer: Word Processing System. Here's what John Martellaro of Peelings II magazine (the only independent magazine devoted solely to the evolution of Apple software) has to say about an earlier version of PIE Writer,

"...one of the best Word Processors available for the money. It has an abundance of user-oriented features...is very fast and has a powerful editor...has to be considered a best-buy word processor. For the money spent, it cannot be beat. The aesthetics of the input, the power of the editor and formatter and the flexibility are impressive."

PROPORTIONAL AND INCREMENTAL SPACING ADDED

And now PIE Writer is even better. We've added the ability to do incremental spacing so that fractions of a space can be added between words when justifying text. This makes the distribution of the space required to fill out a justified line more uniform and less noticeable. In addition, with its optional proportional spacing formatter program, PIE Writer becomes the **ONLY** word processor that can print true proportionally spaced documents. Even Word Star™ at almost 3 times the price, can't do that. PIE Writer can also save the final formatted text on a disk for printing at a later time.

PIE WRITER IS EASY TO USE

Because it is so simple to learn, PIE Writer can be used by anyone who can use a typewriter. The new, simplified manual and interactive tutorial will have even the inexperienced user up and running quickly. In just a matter of minutes you will learn how to enter and delete text, modify what has already been entered and format your information so that it is printed exactly the way you want it.

PIE WRITER IS VERSATILE

Versatility and compatibility are two important features of PIE Writer. While some word processors for the Apple II computer will only work with specific accessories, such as 80-column display boards, lowercase adapters and printers, PIE Writer is versatile enough to work with almost any combination of these. For example, the standard version is available for use on standard Apple II computers with a 40-column display. However, if you have any of the commonly available 80-column display boards, such as

the Videx Video Term, Sup'r Term, Smarterm or Double Vision, we have a version of PIE Writer for you. Specify the version you want when ordering.

While the standard Apple computer does not permit the user to enter lowercase characters from the keyboard, PIE Writer does. Even more, PIE Writer supports a wide variety of lowercase adapters that are available, such as those that are available from Dan Paymar, Lazer Systems and Videx.

In addition, PIE Writer permits the user to display and print lines as long as 132 characters (for the 80-column version of PIE Writer). If you want to see what your text will look like on the printed page before it gets there, you can preview the final page 24 lines at a time and check for page breaks and even get a final page count before the document is printed.

So why settle for less than the best. Get PIE Writer today. A comparison with the other leading word processor ought to convince you.

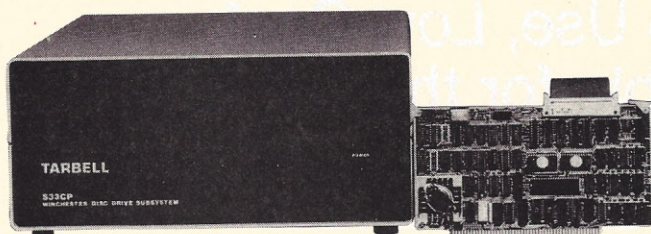
	PIE Writer	WordStar™
Incremental spacing (microspacing)	Yes	Yes
Proportional spacing	Yes*	No
Split and glue	Yes	Yes
Word Wrap Around	Yes	Yes
Page scrolling (forward & backward)	Yes	Yes
Supports upper & lower case adapters	Yes	Yes
Automatic centering	Yes	Yes
Custom form letters	Yes	Yes
Saves text or binary files	Yes	No
Flexible formatting	Yes	Yes
Suppressed & continued page numbering	Yes	Yes
Hyphenation	No	Yes
Save text segment to a new file	Yes	Yes
Insert text from another file	Yes	Yes
Underlining	Yes	Yes
Automatic search & replace	Yes	Yes
Edits page breaks	Yes	Yes
Status display	Yes	Yes
80-column board version for the Apple	6	3
Price of software	\$149.95	\$375.00
Total installed price	\$149.95	\$724.00**

*Optional
**Includes \$349 for a Z80 card.

WordStar is a registered trademark of MicroPro International, Apple is a registered trademark of Apple Computer, Inc.; neither is affiliated with Hayden Book Co.

How to order: call 800-631-0856, or write to Hayden Book Co., Inc., 50 Essex Street, Rochelle Park, N.J. 07662. Also available from your local computer store.

S-100 Computer Owners... Need more capacity, speed and reliability?



Tarbell 33 megabyte winchester subsystem

CAPACITY □ Do you need more disk memory for business applications? Tarbell's hard disk subsystems allow expansion from 10 to over 200 megabytes. And our ATTACH program provides a way to get up-and-running quickly.

SPEED □ In most business applications, speed of the disk subsystem is the limiting factor for overall system speed. All Tarbell hard disk subsystems 33 megabytes and above use a voice-coil actuator which provides an average access time of 50 milliseconds. Data comes off the disk into your deblocking buffer at the maximum possible speed of 1 megabyte per second, meaning that a 24 kilobyte file can be loaded into memory in about one second!

RELIABILITY □ Winchester drives have higher inherent reliability because the media and heads are in an air-sealed environment. Other drives are open to contamination from smoke, chemicals and other particles in the air.

Subsystem includes S-100 interface, drive, cabinet, power supply, cables, software and all documentation.

Tarbell
Electronics

MANUFACTURER OF COMPUTERS,
COMPONENTS AND SOFTWARE

950 DOVLEN PLACE • SUITE B
CARSON, CA 90746 • (213) 538-4251

CIRCLE 81

**computer
case
company**

• AP103

**comp
case**

NOW TOLL FREE
800-848-7548

• AP101	Apple II with Single Disk Drive	\$109
• AP102	Apple II with Double Disk Drives	119
• AP103	Apple II, 9 inch Monitor & Double Drives ..	129
• AP104	Apple III, two additional Drives & Silentyte	139
• AP105	12 inch monitor plus accessories	99
• RS201	TRS-80 Model I, Expansion Unit & Drives ..	109
• RS202	TRS-80 Monitor or TV set	84
• RS204	TRS-80 Model III	129
• RS205	Radio Shack Color Computer	89
• AT301	Atari Computer & Accessories	109
• P401	Paper Tiger 440/445/460	99
• P402	Centronics 730/737 Line Printer II/IV	89
• P403	Epson MX70 or MX80	89
• P404	Epson MX100	99
• P405	IDS 560 or Prism Printer	109
• IB501	IBM Personal Computer	129
• IB502	IBM Monitor	99
• CC80	Matching Attaché Case (5")	85
• CC90	Matching Attaché Case (3")	75
• CC91	Matching Accessory Case	95

computer case company

5650 INDIAN MOUND CT COLUMBUS, OHIO 43213 (614) 868-9464

CIRCLE 90

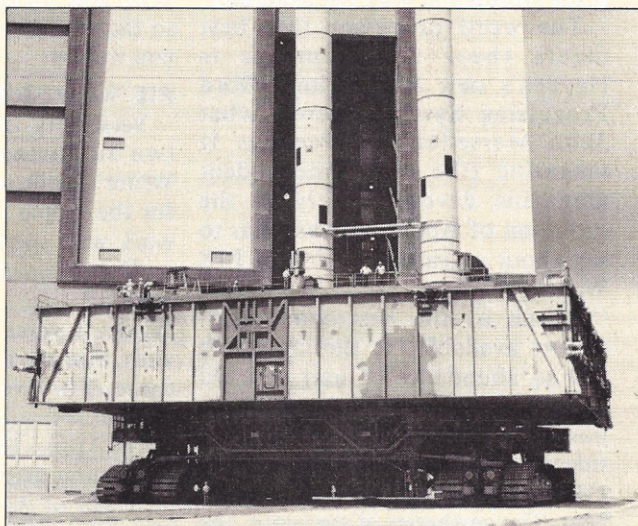
OUTLOOK

FINAL FRONTIER

(continued from page 136)

NASA has only two scheduled landing sites for the space shuttle: Kennedy Space Center and Vandenberg Air Force Base in California. But NASA has provided for five alternative landing sites scattered around the globe. This makes emergency landing possible if weather, flight/orbit changes or other problems make the prime site unusable.

Maintaining all five sites full-time would be costly. So the landing equipment gets moved from place to place as



Computers are tracking all vehicle mileage throughout the Space Center, including this 6.3 million pound crawler/transport.

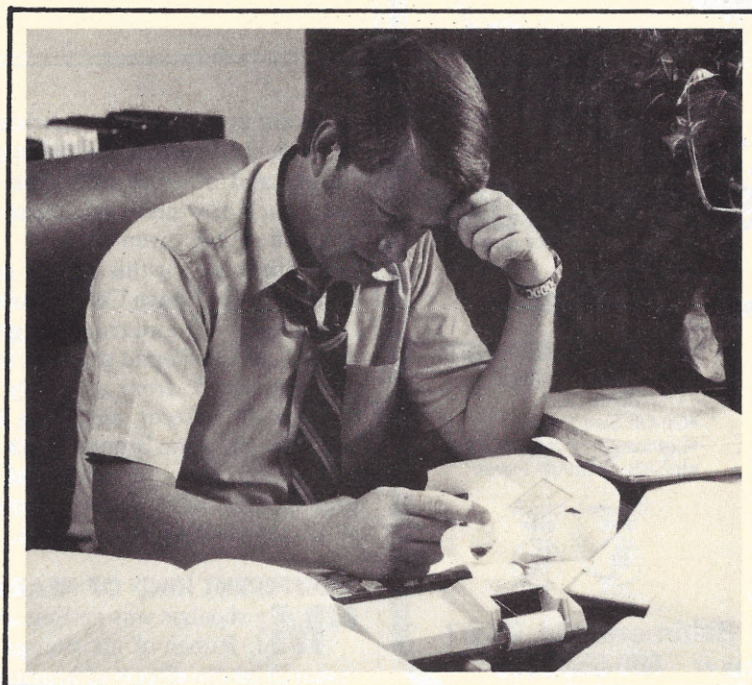
needed. Louis Phillips, a NASA packaging specialist, is in charge of readiness. He determines which equipment is sent to which site, when it is sent, how long it stays, and how it is packed. Each location requires a slightly different complement of equipment. The list of items changes constantly as it becomes evident that a piece of equipment is not necessary or that other equipment would work better.

NASA administration was considering the purchase of a minicomputer system to handle readiness, but instead went to a Commodore CBM equipped with Jinsam 8.0. Now Phillips' records contain fields for the equipment's name, serial number and present location.

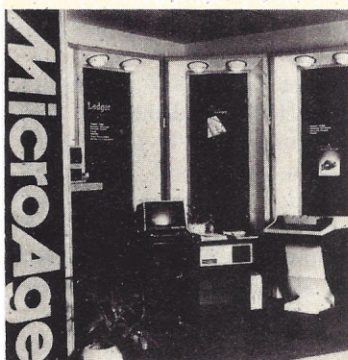
The computer system can be told to search a file for an individual piece or for a whole class of information, and it is compact enough for Phillips to take it on location with him. His average full-file search takes only two seconds, so he can produce organized equipment lists quickly and send them with each shipment to the alternate landing sites.

The Central Instrumentation Facility engineering team uses two more Jinsam/Commodore systems to

CASH FLOW PROBLEMS?



IT'S NICE TO KNOW SOMEONE WHO HAS THE SOLUTION.



MicroAge is your Solution Store . . . that means at MicroAge Computer Stores we have a wide selection of time-saving computerized business systems designed specifically to solve the daily cash flow problems every businessman faces.

MicroAge has computerized business systems that

quickly and affordably allow you to regain control of your critical accounts receivable . . . at last making it possible for you to carry out effective collection procedures on a consistent basis. MicroAge has accounts receivable program packages to automatically display and update account information; prepare trial balance

including a balance-due and delinquency aging report, and take care of dozens of other tasks that eat into your time and profit!

Computerized business systems from the MicroAge Computer Store are available in the \$5,000 to \$15,000 range, to suit the individual budget of your small business or professional practice. MicroAge backs up every system with personalized service, warranty service and repair, installation, systems consulting, even customer training. Visit the MicroAge Computer Store in your area soon with your business problems, and let us help you with the solution.

MicroAge®
COMPUTER STORE
"The Solution Store"

VISIT THE STORE IN YOUR AREA:

El Paso, Texas
(915) 591-3349

Rockville, Maryland
(301) 762-7585

Albuquerque, New Mexico
(505) 883-0955

Pleasant Hill, California
(415) 680-1489

Aurora, Colorado
(303) 696-6950

Rochester, New York
(716) 244-9000

Hurst, Texas
(817) 284-3413

Salina, Kansas
(913) 823-7596

Orland Park, Illinois
(312) 349-8080

Millwaukee, Wisconsin
(414) 257-1100

Mountain View California
(415) 964-7063

Anchorage, Alaska
(907) 279-6688

San Diego, California
(714) 278-0623

Houston, Texas
(713) 270-9647

Minneapolis, Minnesota
(612) 338-1777

Omaha, Nebraska
(402) 339-7441

Phoenix, Arizona
(602) 265-0065

Columbus, Ohio
(614) 868-1550

Indianapolis, Indiana
(317) 849-5161

Portland, Oregon
(503) 256-4713

Norwalk, Connecticut
(203) 846-0851

St. Louis, Missouri
(314) 567-7644

Oklahoma City, Oklahoma
(405) 728-1837

Houston, Texas
(713) 440-7547

W. Palm Beach, Florida
(305) 683-5779

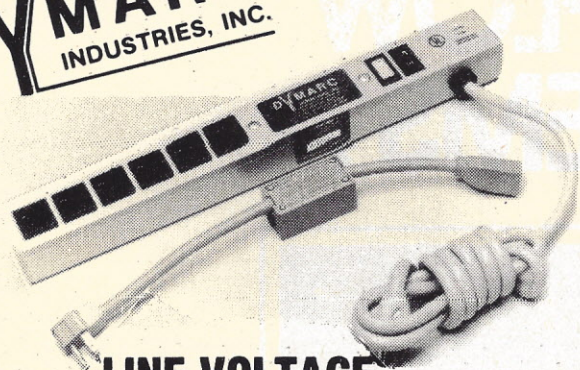
Toronto, Canada
(416) 487-5551

Houston, Texas
(713) 270-9647

Wilmington, Delaware
(302) 658-3672

Allentown, Pennsylvania
(215) 434-4301

DYMARC
INDUSTRIES, INC.



LINE VOLTAGE TRANSIENT SUPPRESSORS

Features Parallel Operation

5000 Hits/Second

Clipstrip™ AND

Clipper™

PROTECTS:

- Computers
- Micro-Computer Systems
- Word Processors
- Cash Registers
- Power Supplies

PROTECTS AGAINST:

- High Energy Voltage Transients
- On-Off Switching
- Lightning Induced Transients
- Inrush of On/Off Power

DYMARC
INDUSTRIES, INC.

DEALER INQUIRIES INVITED

Clipstrip
977E



LISTED

Clipper
678F



LISTED

7133 Rutherford Rd. Baltimore, Md. 21207
(301) 298-3130 CIRCLE 71 800-638-9098



MALA

Educational Programs
For Your Pet For Only

\$48

For 8 Issue Subscriptions

Each "MALA" comes to you on cassette with 4 brand new programs to load and run on your Pet.

**COMM*DATA
SYSTEMS, INC.**

P.O. BOX 325

MILFORD, MICHIGAN 48042

(313) 685-0113

GAMES FOR YOUR VIC

VIC TREK • HANGMAN
TANK • YAHTZEE
DAMSEL • NAB PLUS
AND MANY MORE

only \$7.95 Each

▶ FREE Program Summaries available

CIRCLE 97

OUTLOOK

maintain inventories of electrical devices, along with calibration readings for maintenance scheduling, efficiency ratings and other reports. The system makes it easy to keep track of which instrument should be recalibrated or serviced at any given time.

Another use for this system is keeping track of vehicle mileage for the Space Center's transportation branch. This covers every car and truck assigned to Kennedy including the 6.3 million pound crawler/transport vehicle that carries the shuttle from assembly building to launch pad.

With the system, designing forms is fairly easy, because the program prompts with questions that help select the correct form for each task. An optional statistical package also helps generate complex statistical analyses of the assembled information.

A DIFFERENT KIND OF HEARING AID

"My shoebox was getting unwieldy," says Dr. Robert J. Ruben of his storage and retrieval system for research on the effects of hearing loss in children. Helping parents and children cope with hearing loss is a central concern for this Bronx, N.Y., otorhinolaryngologist (ear, nose and throat specialist), professor and department chairman.

Ruben was getting buried by his research success. In addition to the results of his clinical studies, he has more than 2000 reference works dating as far back as the 17th century. He decided that he needed a computing system that was powerful enough to handle his required files and sorting.

To solve his problem, the White Plains, N.Y., Computer Corner sold Ruben an Apple II Plus and the PFS and PFS: REPORT data-base management system from Software Publishing of Mountain View, Calif. "With the system I have been able to facilitate a number of very important clinical studies that ended with a major paper," Ruben says. "The studies will have an effect on the delivery of health care to probably 30 percent of the children in America."

In his paper, "Recurrent Middle Ear Effusion in Childhood: Implications of Temporary Auditory Deprivation for Language and Learning," Ruben examines a group of children under the age of five who are afflicted with middle-ear-fusion problems (fluid in the ear).

The study compares the cognitive differences of these children with their brothers and sisters who do not have ear problems. To complete the study, Ruben had to tie together not only his extensive information bank but the results of some of the other 120 studies he has written. The system lets him store data, retrieve information and generate reports comparing many variables.

Ruben also uses his system for patient tracking and record-keeping. He feels it has saved his office staff time that used to be spent entering patient information and

COMMODORE
4032 VIC 20
SUPERPET 8032

ROCKWELL
AIM 65
RM 65

HEWLETT-PACKARD
HP-125 HP-85 VIRGO
HP-85 CAPRICORN

XEROX
820

APPLE
APPLE III APPLE II PLUS

WANG
WANGWRITER

ATARI
800

DEC
PERSONAL COMPUTER

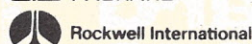
NEW

BEST WORD PROCESSING IN THE WORLD—WANGWRITER

Compumart is proud to announce the addition of Wangwriter to our product line. The finest word processor in the world. The Wangwriter is actually **four** products in one—a typewriter, a word processor, a CP/M personal computer, and an intelligent terminal. You'll find these outstanding features on the Wangwriter: Dual disk • Up to 128K memory • CP/M • Advanced word processing—math, merge, sort and auto pagination • 75 pages of text on each 5 1/4" disk. Supercalc Communications option—connects to RS232 Interface or Wangnet.

It's no wonder that Wang, with 65% of the shared logic word processing market is the number one company in the field. When you think of word processing, think of the Wangwriter. You could free up to 20% of your secretary's time! And when you need a typewriter, CP/M computer, and an intelligent terminal, think of the Wangwriter too. Call Compumart today for configuration help.

Authorized Dealers For:



XEROX

WANG

COMPUMART/Customized Systems

35 Bent Street, Dept. 184
PO Box 568, Cambridge, MA 02139

TELEX: 921401 COMPUMART CAM

800-343-5504

In Mass call 617-491-2700

If you prefer, call our Ann Arbor Michigan store
313) 994-6344



IMPORTANT ORDERING INFORMATION

PHONES: open EST Mon.-Thurs. 8:30-7:00, Fri. 8:30-6:00, Sat. 11:00-4:00;

PURCHASE ORDERS: Accepted from Dun and Bradstreet rated companies—shipment contingent upon receipt of signed purchase order.

SALE PRICES: Valid for month of magazine date only—all prices subject to change without notice. **ANN ARBOR RETAIL STORE**

HOURS: Tues.-Fri., 11:00-7:00, Sat. 10:00-5:00, closed Mondays.

SOFTWARE • HARDWARE • SUPPLIES • DISCOUNT PRICES •

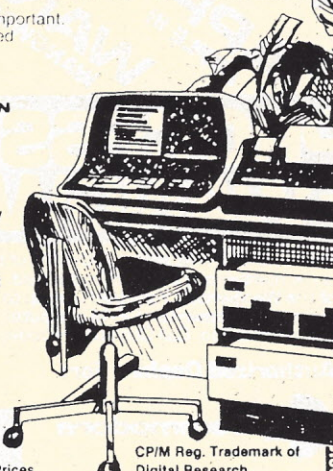
THE SMART WAY
TO BUY

CP/M® SOFTWARE

Saving money on software is important. But today's buyer requires added services. Trust STANDARD SOFTWARE for all your micro-computer needs!

THE LARGEST SELECTION IN THE U.S.A.
We have more CP/M Software than anyone!

- All Popular Formats
- Over 200 Applications Available
- Discount Prices • Prompt Delivery
- Emergency Shipments Arranged
- Courteous Salespeople
- Free Technical Support
- 100% Refund if Product Does Not Perform as Documented
- East Coast Distribution Center
- No Shipping Charges on any Multiple Purchase
- Mastercard & VISA Accepted. C.O.D.'s No Problem
- No Additional Fees on Credit Card Purchases
- Purchase Order Accepted from Qualified Corporations
- Hardware Available at Low, Low Prices



CP/M Reg. Trademark of Digital Research.

standard software

CORPORATION OF AMERICA

10 MAZZEO DRIVE, RANDOLPH, MA 02368
617-963-7220

SOFTWARE • HARDWARE • SUPPLIES • DISCOUNT PRICES •

CIRCLE 93

NEC PC-8001

\$759
list \$995



NEC PRODUCTS:

	list	FUTRA
PC-8012 I/O UNIT with 32K	\$ 995	519
PC-8031A Dual Disk Unit	995	859
PC-8023A Dot Matrix Printer	795	535
JC-1201M(A) 12" Color Composit	495	CALL
JC-1201DH 12" Color RGB	1095	949
JB-1201M(A) 12" Green Composit	210	169

EPSON PRINTERS:

	list	FUTRA
MX-80 Dot Matrix Printer	645	455
MX-80/FT Friction/Tractor Ver	745	555
MX-100 Wide Carriage Printer	995	725

KONAN HARD DISK SYSTEMS

	list	FUTRA
5.0 MBYTE "DAVID-1" 5 Megabyte	2995	2299
8.4 MBYTE "DAVID-2" 8 Megabyte	3650	2745
12.6 MBYTE "DAVID-3" 12 Megabyte	3975	3049

(Above prices for Apple/NEC/Xerox) Add \$100 for S-100 adapter

SUPPLIES:

	list	FUTRA
5" 744-ORH SS,SD O-SEC	45	27
5" 744D SS,DD O-SEC	55	34
5" 744D Head Cleaning Kit	30	24
8" 740-0 SS,SD O-SEC	42	35
8" 741-0 SS,DD O-SEC	50	37
8" 7400 Head Cleaning Kit	30	24

SOFTWARE:

	list	FUTRA
ASHTON-TATE "DBASE-II"	700	479
MICROPRO NEC/APPLE "Wordstar"	379	225
NEC General Accounting	395	269
NEC A/R - Inv. - Payroll - Job cost	395 ea.	269 ea.
NEC Select Word Processing	495	371
NEC CP/M	150	129
NEC Report Manager	200	149
NEC Game Pack 1 (Alien, Space War)	30	27
NEC Game Pack 2 (UFO, Bomber)	30	27

Mail Order: **FUTRA COMPANY** Retail: **OMC**
P.O. Box 4380—Dept. P3 20695 S. Western Ave #124
Torrance, CA 90510-4380 Torrance, CA 90501

Order Line: (800) 421-5006 Retail: (213) 328-1760 Information: (213) 328-8951
TWX: 910 349 6211 ANS: AGENFTRA TRNC

TERMS OF SALE: Shipping add 3% for product shipped within continental USA via UPS surface (minimum \$6.00). If the order is placed prepaid with U.S. funds in form of check or money order, a total charge of \$6.00 is all you pay within the continental USA via UPS surface. Allow 14 working days for personal and company checks to clear. Credit card charges limited to \$1000. No COD's FPO, APO or orders outside continental USA call or write for shipping charges or add 20% to purchase price. (Any difference will be refunded). California residents add 6% sales tax. All offers subject to change or withdrawal without notice.

CIRCLE 94

OUTLOOK

keeping files up to date.

Recent enhancements to the software also allow Ruben and his staff to change form design without having to re-enter the data, sort printouts by any item on the form, sort and merge files with different form designs, and keep track of file size.

HAS THE U.S. GOVERNMENT BEEN REMISS?

If the United States wants to maintain world economic leadership, it must give higher priority to the computer and telecommunications industries, according to Frederick Williams, a professor at the University of Southern California's Annenberg School of Communications.

"Too many of our resources are being used to prop up aging manufacturing industries like steel and automobiles. We're losing manufacturing markets to foreign competitors left and right," Williams says. "We still have the lead in information technologies, but other countries, particularly Japan, are rapidly closing the gap."

Williams faults the government for shortsightedness in creating an "oppressive web of regulation and litigation that has hampered the growth of our major computing and communications firms."

Although recent settlements of antitrust suits against AT&T and IBM signal a change in direction, he says, the litigation has taken a heavy toll on resources that could have been put into product development and marketing. "The world's largest telephone company and the world's largest computer company have had to spend millions and millions of dollars trying to keep the government off their backs, while many of their foreign competitors are actually subsidized by government," Williams says.

"The difference in government policy gives an edge to companies like Japan's Hitachi Ltd., which recently announced plans to mass-produce the next generation of computer memory chip.

"We've taken our computing and telecommunications industries too much for granted," he states. "They've been able to grow, despite government interference, only because the market is so good and because their research and development is so good."

Rather than continue on a course that Williams describes as "muddling through," he says it's time for America to adopt a policy of "managed change." A scenario for this alternative course is set forth in Williams's book, *The Communications Revolution*, in which he explores the social consequences of living in an electronic age.

A policy of managed change, Williams says, could have the dual objectives of maximizing growth in the computer and communications industries while maximizing the social benefits of that growth. Local telecommunications networks could be interconnected to provide a range of

(continued on page 149)

JINSAM



Data Manager selected by NASA, Kennedy Space Center

SAVE TIME! SAVE MONEY!

**JINSAM saves taxpayers
100's of thousands of \$**

COMING ATTRACTIONS!

**Jinsam EXECUTIVE
for the
IBM Personal Computer.
See your local dealer**

★ **CUSTOM DATA FILES**
★ **CUSTOM REPORTS/LABELS**
★ **KEYED RANDOM ACCESS**
★ **FAST/EASY/MENU DRIVEN**
★ **MULTIPLE SEARCH KEYS**
★ **PRIVACY ACCESS CODES**
★ **WILD CARD SEARCH**

JINSAM EXECUTIVE version (soon to be released) is our most powerful professional system for the CBM 8000 and 9000 series. Executive will have 8.2 extended features plus allow multiple users with in-use lockout protection, executive command files, automatic math relations, join, merge or link files, greatly increased record capacity and machine information search by word, as well as by key or record number and many, many more features.

There are currently 7 more interfacing modules – and more under development, including independent interfaces between JINSAM and business packages for your G/L, A/R, A/P needs. We announce the availability of modules and enhancements in JINSAM's quarterly newsletter.

WORDPROPAC - Intelligent interface for WordPro 3, 3+, 4, 4+, creates lists of information from JINSAM files. It allows up to 10 conditions based on each item of information. Produce individualized letters, report cards, special reports, checks, invoices, etc.

MULTI-LABEL - Prints multiple labels per record with up to 2 lines for messages and consecutive numbering. Produce inventory, caution labels, bulk mail labels, etc.

MATHPACK - global calculator/editor +, -, *, /, by another field or constant; null (remove contents) of a field or replace contents of a field with any word, number or phrase. Sum multiple fields in each record or running sum of single field in all records. Extract information or effect permanent change. Replace in the same field or place in a waiting field.

DESCRIPTIVE STATPACK - Determine MEAN, MEDIAN, MODE, STANDARD DEVIATION, VARIANCE, RANGE. Generate HISTOGRAMS from 1 to 25 steps, and produce Z-SCORE reports.

ADVANCED STATPACK - (You must also acquire DESCRIPTIVE STATPACK) Generate one, two or three way CROSSTABS (number of occurrence) CHI SQUARE, LINEAR REGRESSION, with graphic representation and prediction. LINEAR CORRELATION and SIMPLE ANALYSIS OF VARIANCE.

CALCPACK - 2 way interface to VisiCalc or any user program. It lets you use VisiCalc for complex manipulation, editing, placing results in JINSAM for sorting, storing or moving data to WordPro as well as giving the ability for exchange with your own applications.

INTERAC - Interface which can read VisiCalc files, WordPro files and almost any sequential files

to build JINSAM databases automatically. For example: You could "download" information on holerith cards to sequential files and INTERAC would place them into JINSAM files.

All accessories are accessed thru the JINSAM menu and require security password to gain entrance.

JINSAM gives you FREEDOM OF CHOICE. Start with JINSAM 1.0 and upgrade hardware and data at any time. Choose from accessories at any time. The JINSAM Newsletter brings the latest updates, user input and uses and keeps an eye on the future.

JINSAM stands alone by placing "a lot of potential computing power in one integrated program package" (Fred Klein, Ferson div. of Bausch & Lomb). "The JINSAM package is justification for buying a system no matter what the hardware, be it Vector or Commodore or whatever the system" (Larry Colvin, Micro Computer Systems). It is a "grandfather" in this young field since the first JINI MICRO database system has been marketed since 1979. JINSAM EXECUTIVE will be the third generation in development. All JINSAM systems are sophisticated and flexible yet easy to use. JINSAM is saving its users valuable time and money in government, educational and research institutions, business and industry worldwide.

JINSAM is a Commodore approved product. See your local dealer for a demonstration.

JINSAM is a trademark of JINI MICRO-SYSTEMS, Inc. WordPro is a trademark of Professional Software, Inc. VISICALC is a trademark of Personal Software, Inc. CBM is a trademark of Commodore Business Machines, Inc. IBM is a trademark of International Business Machines.

JINSAM Data Manager

.... Additional Information and nearest dealer
.... Newsletter Subscription (\$5 US/\$8 Worldwide)
.... JINSAM Demo Disk (\$15, plus shipping & tax)
.... User's Guide (\$40.00, plus shipping & tax)

Please send to:

Name _____

Position _____

Company _____

Address _____

City, State, Zip _____

Phone () _____

Computer, Disk _____

Application _____

JINI MICRO-SYSTEMS, Inc.

Box 274C • Kingsbridge Station
Riverdale, New York 10463
(212) 796-6200

Dealer Inquiry Welcome

**“Much more powerful than
you can imagine!”**

**Robert Baker
Kilobaud Microcomputing**

JINSAM is an integrated system. It makes it easy to use your information to its fullest. No more will hundreds of valuable hours be spent searching or analyzing needed information nor re-entering information for various reports.

JINSAM transforms your desk-top computer into the "state of the art" data processing machine with features and accessories found nowhere, even at 10 times the price. NASA, Kennedy Space Center selected JINSAM 8.0 and saved approximately \$95,000 over other software/hardware costs. Riley County, Kansas also selected JINSAM 8.0 and saved approximately \$90,000 over other software/hardware costs.

JINSAM is designed for you. It is forgiving. It has help commands for every option, available at the touch of a button. The amount of information you store, its structure and/or your hardware can change but your data won't have to be re-entered. Recovery utilities are included even for catastrophes, security passwords are built in for privacy, simple editing and entry includes auto recall, and deleting records is easy and the space is reclaimed. JINSAM includes TWO FREE accessories for reports and labels. You have unlimited report formats with summing and lined up decimals and the label printer prints up to 5 across – any size and even allows single envelopes or index cards.

JINSAM 1.0 allows fast and easy file handling, manipulation and report generation for any CBM computer with CBM 2040 disk drive. It features a menu for ease, has encrypted passwords, 3 deep sorts, .5 to 3 second recall.

JINSAM 4.0 for CBM 4000 series adds JINSORT, user accessible machine sort of 1000 records in 15 seconds; compaction/expansion of information, automatic list maintenance, unlimited number of fields, unlimited record length and much more.

JINSAM 8.0 for CBM 8000 series has all 4.0 features plus unlimited sort, horizontal format, and search by key or record number.

JINSAM 8.2, NEW FOR '82 expands 8.0 capabilities by adding information search by word, key or record number and machine language print, format and manipulation routines.

You don't have to change
the way you do business,
the Data Factory adapts to you.

Do it your way!

Another fine product
from the people who
brought you:

Invoice Factory
The Merger
VisiFactory
Language Plus
Tax Manager
Asset Manager
The Learning System
and many more.

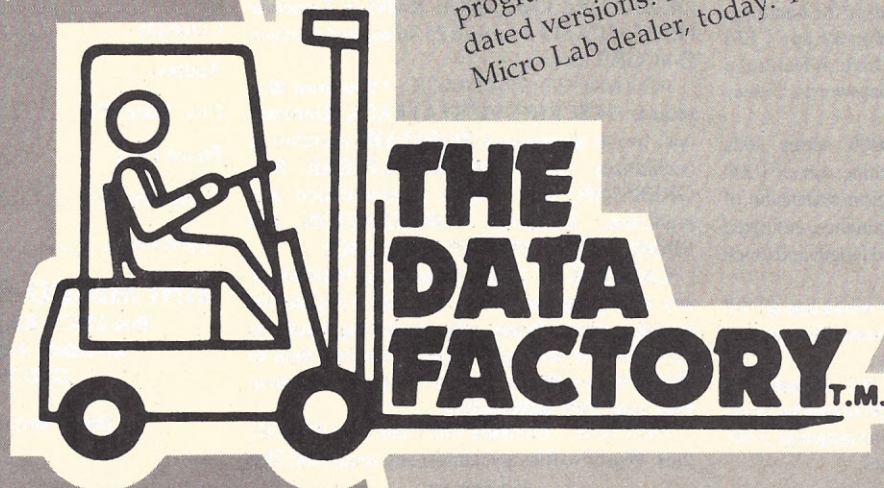
micro lab
systems that work
2310 Skokie Valley Road,
Highland Park, IL 312-433-7550

The new version of the Data Factory is COMPLETELY ADAPT-
ABLE. It includes a customized data entry system that allows
you to position information anywhere on the screen. The flex-
ible printout routine frees you from formatting constraints
giving you pinpoint control.

A new Master Search routine will locate records by any criteria
you wish... from one value to another, date-to-date, by the be-
ginning of a field, a complete field, or within it, greater than, less
than, equal to, not equal to, and any combination of the above.

The sequence can be stored for future use.
The new sort feature flashes through 1,000 records in less than
six seconds. Work with two, on-line disks giving you 225,000
bytes of data storage capacity. The expanded math routine has the
most advanced math capabilities for an Apple data base, use it
across all fields and store the answers on data disk. You may still
add, delete, or change fields without re-entering information:

Change up to 10,000 fields of data at one time.
Anyone can use the power and flexibility of the new Data Fac-
tory. Prompts guide you throughout. It's difficult to
imagine what else anyone would need. The package
includes two master disks and two back-ups. A one-
year Extended Warranty is included in the price of the
program that replaces blown disks and provides up-
dated versions. Available now at \$300. See it at your
Micro Lab dealer, today. You'll need an Apple II-48K.



THE DATA FACTORY^{T.M.}

NDS NATIONAL DATA SUPPLIES, INC.



BASF

FLEXYDISK®

Certified 100% error free. Trust your valuable data to a quality brand name flexible disk.

Stk. #	8" DISKETTES, BOX OF TEN	
428	1 SIDE SINGLE DENSITY SOFT SECTOR	\$26.70
431	REVERSIBLE 428 - Use both sides	\$44.80
568	1 SIDE DOUBLE DENSITY SOFT SECTOR	\$35.70
596	1 SIDE DOUBLE DENSITY HARD SECTOR	\$35.70
Stk. #	5.25" DISKETTES, BOX OF TEN	
256	1 SIDE SINGLE DENSITY SOFT SECTOR	\$26.70
257	1 SIDE SINGLE DENSITY 10 SECTOR	\$26.70
646	1 SIDE DOUBLE/QUAD DENSITY SOFT	\$34.40
649	1 SIDE DOUBLE/QUAD DENSITY 10 SECTORS	\$34.40

HEAD CLEANING FLEXYDISK.

Specially designed to clean the heads of your disk drive without solvents or liquids.

Stk. # BOX OF THREE AS SHOWN

731 8" DISKS \$35.00

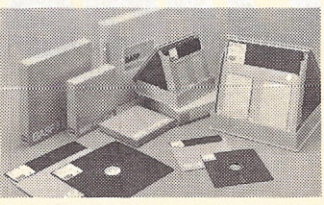
732 5" DISKS \$35.00

NOTE: For use only on single head drives.

Stk. # ONE DISK ONLY

730 8" DISK \$17.95

733 5" DISK \$17.95



RIBBONS — QUALITY, BRAND NEW, LONG-LIFE EXACT REPLACEMENT RIBBONS AND CARTRIDGES. FITS THESE PRINTERS.

Stk. #		Price	Quantity
421	Centronics 700 series, LP, I, II, IV (zip pack insert).	\$12.00	3
430	NEC Spinwriter. Multistrike black. Box of six	\$42.25	6
465	Centronics 104	\$15.79	EA
471	Diablo HY Type II. Multistrike black cartridge. Box of 6	\$27.75	6
473	Diablo HY Type II. Black nylon fabric for long life.	\$18.00	3
476	QUME. Multistrike black.	\$24.00	6
495	Texas Instruments 810.	\$12.00	3
496	Decwriter LA 30/60.	\$12.00	3
498	Decwriter LA 180, Texas Instruments 820	\$15.00	3

Flip 'N' File™

PROTECTIVE STORAGE SYSTEM FOR UP TO 60 DISKS. TRANSPARENT SMOKE COLORED ACRYLIC CONSTRUCTION WITH HINGED LID AND INDEX DIVIDERS.

Stk. #		Price
605	FOR 5" DISKS	\$24.95
608	FOR 8" DISKS	\$29.95

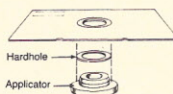


LIBRARY CASES — AN INEXPENSIVE AND CONVENIENT METHOD OF DISK STORAGE. EACH CASE HOLDS TEN DISKETTES.

Stk. #		Price
108	8" LIBRARY CASE	\$3.95 ea.
105	5" LIBRARY CASE	2.95 ea.

HARDHOLES — ADDED STRENGTH REINFORCING RINGS PREVENT HOLE TEARING AND RIPPING DAMAGE. MADE OF HEAVY-DUTY MYLAR.

Stk. #		Price
801	8" APPLICATION KIT	\$11.95
800	EXTRA BOXES OF 50 HOLES	\$ 8.00
501	5" APPLICATION KIT	\$ 8.95
500	EXTRA BOXES OF 50 HOLES	\$ 6.00



DISK DRIVE HEAD CLEANING KIT

REDUCE READ/WRITE ERRORS AND EXTEND MEDIA LIFE.

• USABLE ON SINGLE AND DUAL SIDED DRIVES

• REMOVES HARMFUL CONTAMINATION BUILD-UP FROM READ/WRITE HEADS.

Stk. # FOR 5" DRIVES \$24.95

708 FOR 8" DRIVES \$24.95



Eliminates data loss, disk drive errors and expensive service calls due to destructive power surges. Plug your computer or other sensitive equipment into Surge Sentry for permanent protection.

Stk. #	Description	Price
907	120V TERMINAL STRIP MODEL	\$ 69.50
901	120V STANDARD PLUG	\$ 89.50
908	120V STANDARD PLUG, SIX OUTLETS	\$112.00



Paper Tractor™

THE PAPER TRACTOR TURNS YOUR TRACTOR FEED SYSTEM INTO A FRICTION FEED PRINTING SYSTEM... INEXPENSIVELY!

- Fits 9 1/2" print frames
- Compatible with matrix, impact, daisywheel and ink injection printheads
- Fits front, back and dual tractor paper feeds
- Positions letter or legal size paper automatically with an edge protecting guide
- Proven with all major manufacturer printers, including Epson, Tiger, GP-80M, Dec-Writer, Commodore, Centronics, and many more

Stk. #1101 \$11.95

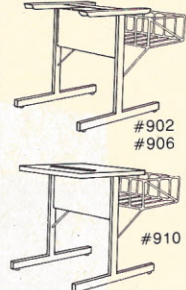
UNIVERSAL PRINTER STANDS AND TABLES

— PRINTER STAND WITH CHROME WIRE BASKET. AVAILABLE IN TWO SIZES, 22" WIDE OR 17" WIDE TO FIT ALMOST ANY PRINTER, INCLUDING TI 810/820, MOST CENTRONICS 700 SERIES, SPINWRITERS, OKIDATA SLIMLINE SERIES, DIABLO 1600 and 2300 SERIES, TRS-80 LP III, DEC LA 34/38, HP 2631A/2635A AND DATASOUTH DS 180.

Stk. #		Price
902	22" WIDE PRINTER STAND	\$125.00
906	17" WIDE PRINTER STAND	\$125.00

PRINTER TABLE WITH CHROME WIRE BASKET. REAL WOOD VENEER TOP THAT IS SLOTTED TO ACCOMMODATE BOTTOM PAPER FEED. TOP IS 24" WIDE BY 18" DEEP. SLOT IS 18" LONG AND 2" WIDE.

Stk. #		Price
910	PRINTER TABLE	\$140.00



VERSAMODEM™

FROM

BIZCOMP

AT LAST! A complete direct connect modem package for Apples, Commodore VIC, and Atari* at a reasonable price. Now you can freely access computer bulletin boards and dial into information utilities such as The Source or MicroNet; retrieve financial information, commodity and stock prices from the Dow-Jones network.

The complete communications package includes:

- 0-300 baud, direct connect, originate only VersaModem.
- Connecting cable from modem to game jack (user port on VIC).
- Terminal emulation software on diskette. (Not included with Atari package, see note.)
- T-adaptor for direct connection to phone line.

No power connections or batteries are needed, the FCC approved VersaModem 1080 derives its power from the phone lines. Apple users: The Apple Comm Card not required.

A deluxe version of the communications package is available for the Apple only. It includes the following additional features:

- Auto dial capability
- Auto answer capability
- Miniature AC power pack
- Originate/Answer Mode



Stk. #		Price
955	Complete package for Apple	\$169.00
956	Complete package for Commodore VIC	\$159.00
957	Package for Atari	\$159.00
958	Deluxe package for Apple	\$349.00

*NOTE: Atari users require the Atari 850 Interface Module and Atari's Telelink Cartridge.

America's information utility. Get timely information on stocks, bonds, commodities. Find Airline schedules and make travel reservations. Use the discount shopping and barter service. Many other facilities available.

Stk. #		Price
965	The Source Electronic Information and Communication Service	\$99.50

800 TOLL FREE 24 HOURS

(800) 227-1617 EXT. 210

IN CALIFORNIA (800) 722-3545 - EXTENSION 210

HOW TO ORDER

BY PHONE: CALL TOLL FREE (800) 227-1617, extension 210 — in California call (800) 772-3545, extension 210. Please order by stock number. Minimum order \$10.00. Operators are not able to answer technical questions. For technical information or other inquiries please call (805) 985-9824.

BY MAIL: Mail your order to
NATIONAL DATA SUPPLIES, INC.
1741 CAPSTAN DRIVE
OXNARD, CA 93033

Include your Master Card or Visa number and expiration date, also your phone

number. C.O.D.'s accepted, add \$1.50. Please order by stock number. Minimum order is \$10.00. Personal checks require two weeks to clear. Purchase orders accepted from well rated companies and institutions. Minimum purchase order amount is \$35.00.

SHIPPING: Calculate shipping charges as follows: up to \$35.00 add 2.50, over \$35.00 add 3% of the total amount ordered plus \$2.50. Items weighing over 50 lbs. will be shipped freight collect by Motor Express. Do not add shipping charges for these items. California residents please add 6% sales tax.



C.O.D.

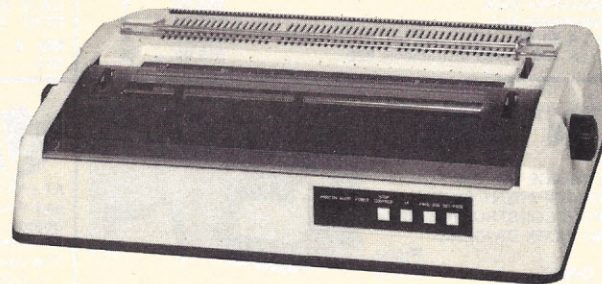


SATISFACTION GUARANTEED

If you are not completely satisfied with your purchase, return the item within 30 days, unused and with the original packaging intact for a full refund.

NDS NATIONAL DATA SUPPLIES, INC.

Can you afford to buy a Word Processor by Mail Order?



What if:

THE MANUFACTURER of the computer is Zenith Data Systems, with a reputation for quality and engineering excellence;

SERVICE is available at over 200 Zenith service centers, and at Heath Electronic service centers nationwide;

SOFTWARE provided is industry standard CP/M 2.2, Supercalc, Microsoft Basic, and your choice of Magic Wand or Wordstar processing software;

THE PRINTER is a 40 CPS daisy wheel letter quality unit designed and manufactured by Japan's leading printer maker, TEC;

THE MANUALS are of the quality established by the leaders in do-it-yourself projects, Heath Company.

And:

THE COMPUTER is the Zenith Data Systems' Z90-2 All-In-One Computer, which includes 64K RAM memory, 5 $\frac{1}{4}$ " double density disk drive, and an 80 column by 25 line screen;

EXPANDABLE with a full line of Zenith Data Systems peripherals, including high speed printers, dual 5 $\frac{1}{4}$ " double density disk drives, dual 8" disk drives, and even a 10 million character winchester drive;

APPLICATION SOFTWARE is available, including General Ledger, Accounts Receivable, Accounts Payable, Inventory Management, and Sales Invoicing from Peachtree Software. CP/M standard programs are available for a wide variety of other applications. Optional application software may require additional disk storage.

So:

THE BOTTOM LINE is a word processing system that includes industry standard software, the best manual in the business, national service, and can be expanded to do general business applications. The price is less than the components and software cost separately at your local computer store.

Can you AFFORD NOT to buy through MAIL ORDER? Only if you don't care about your money!

The price is \$3995—believe it or not!

basic time

17129 S. Kingsview Ave., Carson, CA 90746

To ORDER or for INFORMATION, CALL:
(213)828-6380

CIRCLE 98

OUTLOOK

U.S. REMISS?

(continued from page 144)

social services, he says. For example, a multifunctional cable TV service could provide entertainment and information, as well as burglar alarms, smoke detectors, and medical health monitors that alert a centrally located emergency-service headquarters.

The government could work with, not against, business by providing tax incentives, low-interest financing and even subsidies. Regulation and antitrust laws would remain in force, but they would be formulated with clear goals and long-range views. This would enable information industries to compete internationally, to help the domestic economy, and to benefit society at large.

Williams concedes that a managed-change policy toward the computer and communications industries will not cure all of our nation's economic ills. "The country needs to grow on all possible fronts," he says, "but growth in some industries becomes more expensive than growth in others, because of pollution problems, materials, prices, scarcity and changing labor forces. In this respect, the computer and telecommunications industries have a lot going for them. They don't need transportation of heavy goods, like the trainloads of coal that go to steel plants. Their major raw material, silicon, is the second most abundant substance on earth, and the industries' energy use and pollutant output are low," he says.

"We don't have to run off into the hills because we have nothing else we can do. As a nation, we can stay in business through computers and telecommunications."

FUTURISTIC PREVIEWS ON COMPUERVE

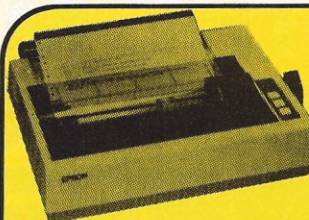
Two new information providers, "Federal Reports" and "The Future File," have been added to CompuServe's national videotex service for personal-computer users. Both are updated with new material on a bi-weekly basis.

In the Federal Reports section, subscribers can access articles and reports on recent legislation and its impact on the U.S. Particular emphasis is placed on activities that affect U.S. financial and investment climates.

Future File includes articles and interviews with futuristic authorities on subjects such as business, politics and the military. This material sheds light on what might be expected from these arenas in the years to come. New technology, today's decisions, and their potential impact on tomorrow's society are also discussed.

CompuServe subscribers can access this information for \$5 per hour weekday evenings and all day Saturday, Sunday and holidays. Weekday daytime access is also available. A personal computer or terminal and a modem are used to access the service.

For more information on these and other services, contact CompuServe, 5000 Arlington Centre Blvd., Columbus, OH 43220; (614) 457-8600.



MX-80 OWNERS

TIRED OF PRINTING ON THE PERFORATION?

TIRED OF JUMPING TO BASIC JUST TO CHANGE PRINT MODES?

REJOICE! MXPLUS IS HERE

INSTALL **MXPLUS** AND YOUR MX-80 WILL SKIP PERFORATIONS AUTOMATICALLY.
(SWITCH SELECTABLE, OF COURSE)

LETS YOU SELECT CONDENSED, EMPHASIZED OR NORMAL PRINTING INSTANTLY USING ONLY THE PRINTER PANEL BUTTONS.

MXPLUS IS A PLUG-IN MODULE THAT INSTALLS IN MINUTES.
NO SOLDERING REQUIRED.

NO MX-80 SHOULD BE WITHOUT MXPLUS.

ONLY

ORDER TODAY

CALL: 800-835-2246x441

OR HI,KS,AK, CALL 213-969-2250

WRITE:

DRESSELHAUS COMPUTER PRODUCTS
22713 VENTURA BLVD, SUITE F
WOODLAND HILLS, CA 91364

\$39.95

POSTPAID CALIF. ADD 6%
SAME DAY SHIPPING
WITH MC/VISA



Riverbank Software Inc.

PROUDLY INTRODUCES

INTERNATIONAL GRAN PRIX

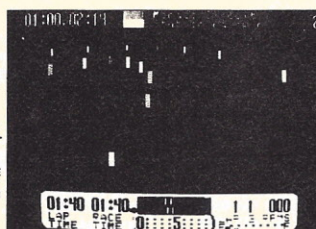
an arcade-like race car simulation

by RICHARD ORBAN

author of THREE MILE ISLAND*

REQUIRES
APPLE II * * OR
APPLE II PLUS * *
48K, 13 OR 16
SECTOR DISK,
PADDLE CONTROL

VISA/MC/CHARGE
MONEY ORDERS/COD
DEALER/DISTRIBUTOR
INQUIRIES INVITED



\$30.00 PER DISK
MD. RESIDENTS ADD 5%
U.S. CURRENCY ONLY
See your local dealer

INQUIRIES AND
ORDERS: 301-478-1312
SMITH'S LANDING ROAD
POST OFFICE BOX 128
DENTON, MD. 21629

• SPECIAL FEATURES •

Five GRAND PRIX-style road circuits, including: Oulton Park, Warwick Farm, Karlskoga, and Monaco • Five speed manual or automatic transmission (with or without cruise control) • Eight levels of difficulty.

• ADDITIONAL FEATURES •

Speeds to 198 MPH • controlled skids • spinouts • spectacular crashes • hair pin turns • narrow corners • obstacles • identified circuit features • number of laps selection • flashing last lap indicator • "Christmas tree" controlled start • switch for silent operation • blue post marks 300' intervals • best lap/best race times posted • fully instrumented control panel: lap timer • race timer • indicator lights • edge detectors • position indicator • steering indicator • moving speed tape • lap counter • gear and RPM indicators • operating fuel gauge

RIVERBANK WILL REPLACE DAMAGED DISKS WITHIN 1 YEAR OF PURCHASE. RETURN DISK WITH PROOF OF PURCHASE PLUS FIVE DOLLARS POSTAGE AND HANDLING FOR IMMEDIATE REPLACEMENT (TEN DOLLARS OVERSEAS)

*TRADEMARK MUSE CO. BALD. MD. • APPLE COMPUTER, INC., CUPERTINO, CA

CIRCLE 77

MEET THE MTI FAMILY OF LOW COST COMPUTERS



- IMMEDIATE AVAILABILITY
- CPM OPTION
- GREAT DISK STORAGE
- MODEL III COMPATIBILITY

- CPM
- WINCHESTER HARD DISK

- 80 x 24 DISPLAY
- 4 Mhz OPERATION

- 90 DAY WARRANTY
- LOCAL DEALER SERVICE
- 1 YR. EXT. WARANTEE AVAIL.

MOD III PLUS/140
We have taken the basic 16K Model III expanded the memory to 48K and added our MTI Double Density, Dual Disk Drive System. System is fully compatible with Radio Shack DOS and peripherals.

FROM \$1998.

MOD III/240
Same as the MOD III PLUS/140 but has double storage capacity, and 2 dual headed 40 track drives.

\$2449.

CP/M-80: Option to run CP/M 2.2. with 80x24 video board for word processing and many other applications.

\$ 849.

MOD III/280
Has 1.5 megabytes of storage and utilizes 2 dual headed 80 track double density disk drives with DOS plus 3.3.

\$2799.

4 Mhz Speed-up enhancement
Doubles the processor speed of the Mod III 140, 240, or 280 systems, when used with the DOS plus operating system.

\$149.

MOD III/WINCHESTER
Our largest business computer system. 5.7 megabytes of storage. Includes a 5 megabyte Winchester hard disk drive and 80 track dual head disk drive used as back up and for conventional floppy disk operation. \$5399.

MTI AUTHORIZED SALES AND SERVICE CENTERS

Anchorage, AK (907) 333-8322
Rodgers, AR (501) 636-9168
Mesa, AZ (602) 833-8949
Phoenix, AZ (602) 244-9739
Sierra Vista, AZ (602) 458-2479
Tucson, AZ (602) 323-9391
Anaheim, CA (714) 773-0240
Covina, CA (213) 332-4088
Goleta, CA (805) 967-7628
Huntington Beach, CA (714) 842-1348
Inglewood, CA (213) 673-3295
Lancaster, CA (805) 942-5747
Montclair, CA (714) 626-4813
Northridge, CA (213) 886-9200
Orange, CA (714) 771-0880
Pacheco, CA (415) 689-2260
Placerville, CA (916) 622-4640
Port Huememe, CA (805) 985-2329

Redondo Beach, CA (213) 370-5556
Riverside, CA (714) 781-6361
San Diego, CA (714) 275-4243
San Jose, CA (408) 946-1265
Santa Ana, CA (714) 850-1228
Santa Monica, CA (213) 393-5785
Vallejo, CA (707) 554-4933
Walnut, CA (714) 594-9760
Westlake Village, CA (213) 706-0333
Colorado Spring, CO (303) 630-3334
Grand Junction, CO (303) 434-3616
Groton, CT (203) 445-5166
Wilmington, DE (302) 762-0227
Hollywood, FL (305) 981-1011
Lynn Haven, FL (904) 265-6452
Mary Esther, FL (904) 243-5793
Tampa, FL (813) 247-6023
Norcross, GA (404) 449-8982

Buckingham, IA (319) 478-2826
Belleville, IL (618) 277-2354
Collinsville, IL (618) 345-5068
Oak Park, IL (312) 386-3323
Shawnee, KS (913) 631-2029
Ashland, KY (606) 325-2210
Shreveport, LA (318) 865-7189
Anoka, MN (612) 427-5783
Cameron, MO (816) 632-6528
Great Falls, MT (406) 737-0901
Missoula, MT (406) 549-9715
Raleigh, NC (919) 755-1175
Grand Forks, ND (701) 772-7848
West Milford, NJ (201) 728-8080
Las Vegas, NV (702) 870-4138
Jericho, NY (516) 333-2266
New Rochelle, NY (914) 235-4444
Syracuse, NY (315) 487-5000

Troy, NY (518) 273-8411
White Plains, NY (914) 761-9283
Tonkawa, OK (405) 628-2693
Tulsa, OK (918) 836-9503
Portland, OR (503) 281-7640
Dallas, TX (214) 247-6679
Missouri City, TX (713) 499-5241
San Angelo, TX (915) 658-3781
Cheyenne, WY (307) 632-9132
Buenos Aires, ARG 32-1858
Paris, FRANCE 306-4606
Holm, GERMANY 4103-4315
Florence, ITALY 55-45-4319
Singapore, JAPAN 220-7182
Cape Town, S.AFRICA 2145-1047
Tahiti, F.P. 2-54-47
Taichung, TAIWAN 4228-5523
Bang Kok, THAILAND 314-1161



MICROCOMPUTER TECHNOLOGY INC.
3304 W. MACARTHUR, SANTA ANA, CA 92704
(714) 979-9923 • TWX 910-595-1902 MTISNA

Call or write for free brochure:
U.S. PRICES, F.O.B. SANTA ANA
CALIFORNIA AND MAY VARY BY AREA.
CP/M is a registered trademark of Digital Research, Inc.

Stop the Floppy Shuffle



Announcing The David Hard Disk Subsystem for \$2995

Compared to cassettes, floppies were the greatest thing since the integrated chip. But with increased applications, data bases, and speed requirements, a lot of business people are spending more time doing the "Floppy Shuffle" and less time doing work.



Now with Konan's David Hard Disk Subsystem you can have 32 times the storage of a mini-floppy in about the same amount of space. At a cost per megabyte that really makes sense, the David Subsystem is available for a variety of micro-computers.

So if you own a personal computer, check into the David Hard Disk Subsystem at

your local dealer.
(Dealers: Contact the nearest distributor below.)

West
Waybern Corp.
1-800-854-8348

Southeast
Micro Distributors
1-800-638-6621

Midwest
High Technology
1-800-325-0600

Northeast
C.P.I.
1-800-448-8802

KONAN
KONAN
KONAN™

KONAN CORPORATION
1448 NORTH 27TH AVE, PHOENIX, AZ 85009
(602) 269-2649, TWX/TELEX 9109511552

CIRCLE 69



Available at your
local computer store.

For Orders and Inquiries,
Call Toll Free
HAYDEN HOTLINE
1-800-631-0856

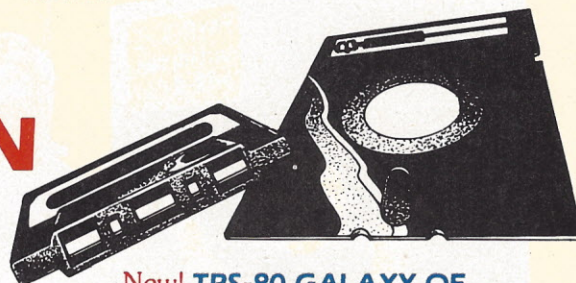
Order Today!

Hayden Book Co., Inc.
50 Essex St., Rochelle Park, NJ 07662
Please send me the software checked. Enclosed is my check, money order, Visa, or Master Card charge account number. PAYMENT MUST ACCOMPANY ALL SOFTWARE ORDERS. Hayden Book Co., Inc. warrants that the programs will load on the standard manufacturer's configuration of the computer listed. Residents of NJ and CA must add sales tax. Offer good in USA only. Prices subject to change without notice.

- | | | | |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| ☐ 02401 | ☐ 03409 | ☐ 03440 | ☐ 07009 |
| ☐ 02403 | ☐ 03410 | ☐ 03444 | ☐ 07012 |
| ☐ 02404 | ☐ 03414 | ☐ 03484 | ☐ 08609 |
| ☐ 03404 | ☐ 03416 | ☐ 04609 | ☐ 08809 |
| ☐ 03408 | ☐ 03418 | ☐ 07004 | ☐ 09903 |
| | | | ☐ 11909 |

Visa/Master Card # _____
Expiration Date _____ MC Interbank # _____
Signature _____
Name _____
Address _____
City/State/Zip _____
PC 4/82-004

TOP PERFORMANCE SOFTWARE FROM HAYDEN



New 3.3 DOS Version!

HAYDEN APPLESOFT™ COMPILER (Eiten) This 3.3 DOS version features several modifications including automatic garbage collection, the ability to print out compiler statistics, and a revised protection scheme to eliminate the need for hardware. These improvements and more are also available in the 3.2 DOS Version.

08809, 3.2 Version; Apple II Disk
11909, 3.3 Version; Apple II Disk
\$175.00 each

APPLE™ ASSEMBLY LANGUAGE DEVELOPMENT SYSTEM: An Assembler/Editor/ Formatter

(Lutus) Write and modify your machine language programs quickly and easily. Features a cursor-based editor, global and local labels, and disk-based macros which allow you to incorporate frequently used subroutines into any program.

04609, Apple II Disk, \$39.95

6502 DISASSEMBLER (Stamm) Produce assembly language source files with labeled subroutines and references from programs already in memory. It is compatible with Hayden's ASSEMBLY LANGUAGE DEVELOPMENT SYSTEM.
08609, Apple II Disk, \$39.95

MICROTYPING (Engel) Features the "touch method" of learning to type for improving your computer typing skills.

02401, PET;
02403, TRS-80 Level II;
02404, Apple II;
each tape, \$10.95

Apple and Applesoft are trademarks of Apple Computer Co., Inc. and are not affiliated with Hayden Book Co., Inc.

New! TRS-80 GALAXY OF

GAMES (Dilley, Savolaine and Wilkerson) A real bargain—and hours of fun, too!

HANGMAN—The most famous word game—you'll get hung up on it! **ONE-ARM BANDIT**—A home version of the casino slot machine! **SKUNK**—An exciting dice game! You get "skunked" when you roll no points! **JACKS**—A card game in which small is great. Trade high cards for low ones and win! **09903, TRS-80 Models I & III, \$14.95**

SARGON II (Spracklens) The first great computer chess program! "... an excellent program which will provide a true challenge for many players. We are impressed with the program's speed, its opening book, and its much improved end game... Save your money and buy SARGON II..." **80 Software Critique**

03404, Apple II tape;
03410, OSI C1P tape;
03418, TRS-80 Models I & III tape;
03440, OSI C4P tape;
each tape, \$29.95
03408, TRS-80 Level II Disk;
03409, Apple II Disk;
03414, OSI C1P Disk;
03416, TRS-80 Model II Disk;
03444, OSI C4P Disk;
03484, OSI C8P Disk;
each disk, \$34.95

REVERSAL (Spracklen) This version of the 200-year-old game Reversi features 27 levels of play and high-resolution graphics. Written by the authors of SARGON II!
07004, Apple II;
07012, Atari;
each tape, \$29.95
07009, Apple II Disk, \$34.95

Hayden

50 Essex Street, Rochelle Park, NJ 07662

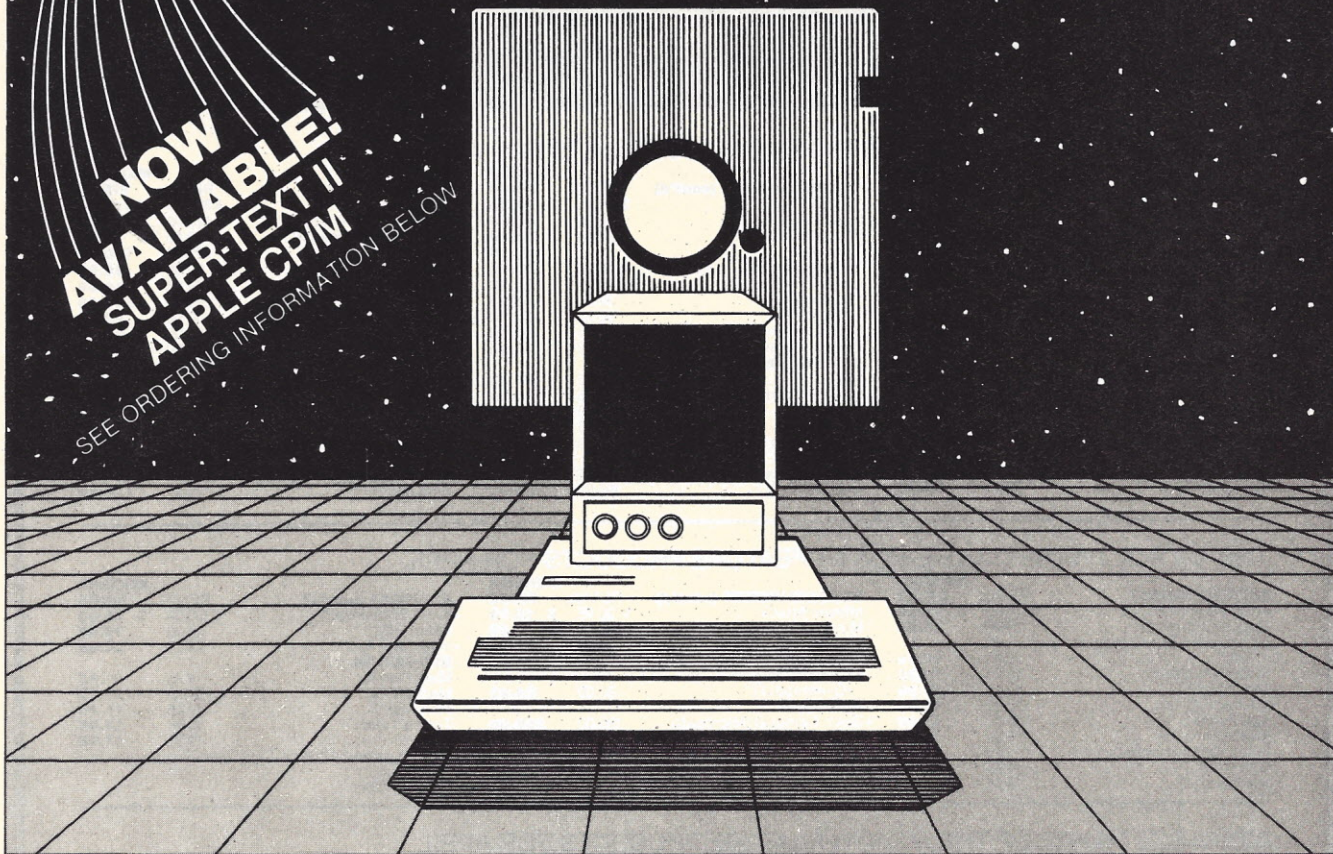
CIRCLE 103

Book Company, Inc.

Professional proofreading on the APPLE II Computer is now a reality

**NOW
AVAILABLE!
SUPER-TEXT II
APPLE CP/M**

SEE ORDERING INFORMATION BELOW



THE APPLE SPELLER fills the void that has consistently kept the large variety of excellent word processing packages for the Apple II Computer from approaching the power of a dedicated work processor. Finally, the first professional quality spelling verification program is available for the Apple II. The Apple Speller will certainly be the standard against which all other similar programs are compared.

The Apple Speller interfaces to the most popular Apple word processors, including Applewriter, Apple Pie, Executive Secretary, Letter Perfect, Magic Window, and Superscribe II, just to name a few. In fact, The Apple Speller can analyze the output of any editor that writes a standard Apple binary or text file to a diskette. In addition to this flexibility, the performance of The Apple Speller will astound the microcomputer world.

The Apple Speller is supplied with a 30,000+ word dictionary on a single 5 1/4" diskette with additional space to easily add another 8,000 words to suit your individual needs.

The Apple Speller has built-in utilities to maintain the dictionary diskette. You can readily add words, delete words, and create an unlimited number of modified and/or new dictionaries for specific application.

The Apple Speller is unbelievably fast. The first pass reads your document and collects all the words it contains at a rate of 5,000 words per minute. Next, the words are compared to the dictionary for spelling errors at the incredible speed of 50,000 words per minute. Finally, all misspelled words are marked as such in your document with a rate of 1,000 words per minute. This translates to proofreading a 10 page document in 1 minute if there are no spelling mistakes and 2 minutes, 15 seconds for an unlimited number of spelling errors.

Numerous options are provided throughout the program to enable you to completely control all activities of The Apple Speller. These include the ability to ignore both control codes and formatting commands, an alphabetical listing of

either misspelled words or all the words in your document along with usage frequencies, multiple options for the action taken with each misspelled word, and much, much more! A verification mode is provided to allow you to examine and dispense with misspelled words while viewing them in the actual context in which they appeared in your file.

The Apple Speller requires an Apple II/Apple II+ equipped with 48K, DOS 3.3, and 1 or 2 disk drives. Two disk drives are required to delete or add words to the dictionary.

The Apple Speller is being introduced at the incredible price of **\$75.00!**



Sensible Software

6619 Perham Drive Dept. PC
West Bloomfield, Michigan 48033
(313) 399-8877

Visa and Mastercard Welcome
Please add \$1.25 postage and
handling per diskette

Please specify program desired

APPLE is a registered trademark of APPLE Computer Company Registered Trademark of DIGITAL RESEARCH CORP. Registered Trademark of MUSE SOFTWARE

CIRCLE 105

SOFTWARE OF THE MONTH CLUB™

Software of the Month Club™, a revolutionary new way to buy name brand software. Available only through Microcon SoftwareCenters™, the "Unhardware"

Store. Choose from these front-line products at 10% to 33% discounts and purchase two more over the next six months at similar savings.

To join call **1-800-343-6214.**

APPLE SOFTWARE OF THE MONTH FEATURE PRODUCTS FOR APRIL

ENTERTAINMENT	RETAIL	MEMBER PRICE	ENTERTAINMENT (cont'd)	RETAIL	MEMBER PRICE	BUSINESS (cont'd)	RETAIL	MEMBER PRICE
Raster Blaster	\$ 29.95	\$ 24.95	Apple Spice	\$ 29.95	\$ 24.95	Basic Compiler	\$395.00	\$315.00
Ultima	39.95	32.95	Bug Attack	29.95	25.95	Pascal Programmer	125.00	99.00
Snack Attack	29.95	25.00	Firebird	29.95	25.95	The General Manager	99.95	75.00
Wizardry	49.95	39.95	Trick Shot	39.95	32.95	DB Master™	229.00	190.00
Falcons	29.95	25.00	Time Zone	99.95	86.95	DB Master Utility Pak I	99.00	85.00
Borgon	39.95	33.00	Cross Fire	29.95	25.50	Home Accountant	74.95	49.95
The Battle Of Shiloh	39.95	26.00	Threshold	39.95	26.95	Spellguard™(C)	295.00	225.00
Operation Apocalypse	59.95	33.95	Torpedo Fire	59.95	49.95	Visblend	50.00	40.00
Roadwork	39.95	48.00	Computer Ambush	59.95	49.95	The Tax Manager	150.00	99.95
Marauder	34.95	28.95	Empire II Interstellar Sharks	32.95	28.95	Visapak™	710.00	600.00
Jawbreaker	29.95	25.95				STCTM Mailing List	50.00	39.95
Ulysses And The Golden Fleece	34.95	23.95	EDUCATION			STCTM IFO-Data Base		
Castle Wolfenstein	29.95	26.95	Algebra I	39.95	35.95	Manager II	200.00	150.00
Thief	29.95	25.95	Counting Bee	29.95	25.50	STCTM Payroll	275.00	200.00
David's Midnight Magic	34.95	27.95	Statistics	29.95	25.50	STCTM Accounts Receivable	350.00	275.00
The Arcade Machine	44.95	35.95	Master Type	39.95	34.95	STCTM General Ledger	350.00	275.00
Track Attack	29.95	25.95	The Coloring Board	60.00	49.95	STCTM Inventory Program	200.00	160.00
			BUSINESS			Superscribe II™	129.95	110.50
			Creative Financing	195.00	175.00			
			Calcstar™(C)	195.00	165.00			

TRS-80 SOFTWARE OF THE MONTH FEATURE PRODUCTS FOR APRIL

ENTERTAINMENT	RETAIL	MEMBER PRICE	ENTERTAINMENT (cont'd)	RETAIL	MEMBER PRICE	BUSINESS (cont'd)	RETAIL	MEMBER PRICE
Armored Patrol	\$ 24.95	\$ 19.95	Missile Attack	\$ 20.95	\$ 15.95	+A.L.D.S.(Microsoft)	\$100.00	\$ 75.00
Armored Patrol (T)	19.95	16.95	Missile Attack (T)	14.95	12.95	Enhgraph	24.95	19.95
Earthquake: San Francisco *1906	20.95	17.95	Astroball	19.95	15.95	+Inventory Plus	29.95	24.95
Space Intruders	19.95	16.95	Astroball (T)	19.95	15.95	EDUCATION		
Star Trek 3.5 (T)	14.95	12.95	Empire Of The Overmind (T)	30.00	24.95	Math Pak-1	14.95	11.95
Cosmic Fighter	19.95	15.95	BUSINESS			Math Pak-2	14.95	11.95
Robot Attack	19.95	16.95	+Basic Compiler (Microsoft)	195.00	165.00	Math Pak-3	14.95	11.95
Attack Force (T)	15.95	13.95	+Fortran 80 (Microsoft)	100.00	79.95	Typing Tutor (T)	19.95	16.95
Defense Command (T)	15.95	13.95	Maxi-Manager	99.95	67.00	+French I	19.95	17.95
Scarfman	19.95	16.95	+Level III Basic (Microsoft)	49.95	39.95	Key: Assume Both Mod I And Mod III Disk Unless Specified.		
Scarfman (T)	15.95	13.95	+TRS-80 muMath (Microsoft)	74.95	66.95	+ Mod I Only.		

ATARI SOFTWARE OF THE MONTH FEATURE PRODUCTS FOR APRIL

ENTERTAINMENT	RETAIL	MEMBER PRICE	ENTERTAINMENT (cont'd)	RETAIL	MEMBER PRICE	EDUCATION	RETAIL	MEMBER PRICE
Rear Guard	\$ 24.95	\$ 20.95	Empire Of The Overmind	\$ 35.00	\$ 28.00	Compu-Read	\$ 29.95	\$ 24.95
Rear Guard (T)	19.95	16.95	Star Trek 3.5 (T)	19.95	17.95	Fractions (T)	29.95	24.95
Treasure Quest (T)	19.95	17.95	Ghost Hunter (T)	29.95	24.95	Decimals (T)	29.95	24.95
Kayos (T/D)	34.95	28.95	3D Tic Tac Toe (T)	19.95	16.95	Assembler (T)	24.95	19.95
Match Racers	29.95	26.95	BUSINESS			Touch Typing (T)	24.95	21.95
K-Razy Shootout (K)	49.95	39.95	Lisp Interpreter	149.95	120.00	Graphics Composer (T)	39.95	32.95
Jawbreaker	29.95	25.95	Letter Perfect W/Mail Merge	249.95	200.00	3-D Supergraphics (T/D)	39.95	32.95
Roadwork	39.95	32.95	Visicalc™	250.00	200.00	Effective Writing (T)	29.95	25.95
Name That Song	14.95	12.95	File Manager 800™	99.95	85.00			
Galactic Chase (T)	24.95	20.95						

GENERAL BUSINESS SOFTWARE OF THE MONTH FEATURE PRODUCTS FOR APRIL

UNIVAIR™SERIES 9000	RETAIL	MEMBER PRICE	General Ledger Accounting System	RETAIL	MEMBER PRICE	Law 1™	RETAIL	MEMBER PRICE	DEMO
Family Medical Management	\$950.00	\$850.00	Accounts Payable Management	\$500.00	\$400.00	The complete legal time and billing package (C)	\$1,495.00	\$ 1,195.00	\$75.00
Family Dental Management	950.00	850.00	Accounts Receivable Management	500.00	400.00	The Boss			
Insurance Agency Management	950.00	850.00	Assume All Require CP/M*	500.00	400.00	Financial Accounting System™	2,495.00	1,995.00	
On-Line Order Entry And Inventory Control	750.00	650.00							

Key: All products on disk unless specified
(C) Requires CP/M*
(T) Tape only
(T/D) Tape or disk
(K) Cartridge
*CP/M is a trademark of Digital Research

NOTE: Members will be informed each month of new products and prices. Guaranteed replacement of defective products for 30 days. Substitutions not permitted. Prices valid to May 15, 1982.

Prices in this ad may not apply to our retail stores.

All sales subject to availability, acceptance and verification. Prices, terms and specifications are subject to change without notice. Allow 2-5 weeks for delivery.

To join the Software of the Month Club™, simply call toll free **1-800-343-6214** or simply send a check with your order including \$2.00 for shipping to:



SoftwareCenters, Inc.™

Software of the Month Club™
25 Elm Street
Watertown, MA 02172

SPECIAL REPORT

COMING ON-LINE

(continued from page 44)

for videotex delivery could go much higher—depending on the complexity of the services offered.

Other basic networking will include the price of a modem, and usually either a communication card or terminal software, depending upon the computer. This can run an extra \$400, more or less, depending mostly on the choice of of modem, be it direct connect or acoustic coupler. Unless you have an unlimited budget, it is unlikely that you'll subscribe to a multiplicity of on-line information retrieval services, or even time-sharing services if you're primarily interested in data processing for your home or business. The monthly fees, if all three of the major utilities are accessed, can put a definite dent in your budget (a cost of \$300 per month would be about as little as you could expect to pay if you accessed all three on a relatively sporadic basis).

Services versus needs

Instead, choices should be made according to the services provided versus your information needs. The big three utilities provide different services with some overlap. Dow Jones, given its ownership pedigree, aims much more toward the business and financial community than The Source or CompuServe. While the latter offer financial updates on stocks, as well as news and information, Dow Jones basically focuses on the needs of the businessman, stockbroker or investor. If you're looking for stock quotes, financial news, economic forecasts, investment information such as company profiles or 10-K reports, you should explore the feasibility of Dow Jones for your system.

Conversely, for the general-information seeker, CompuServe and The Source provide information that is likely to be of interest in terms of entertainment, service information, programming and instruction. 

THE CENTRONICS 739. MORE THAN YOU'D EXPECT FROM AN INEXPENSIVE DESK-TOP PRINTER.

The Centronics Model 739. Here's proof that inexpensive doesn't have to mean incomplete. The Model 739 will perform just as dependably as the workhorse printers that have made Centronics the leader in printer performance. Look at the key features.

CORRESPONDENCE QUALITY—Clear characters, right justified, proportionally spaced for a custom quality printing.

GRAPHICS—for business.



Everything from bar charts and curves to illustrations.

3-WAY PAPER

HANDLING—Cut sheet, roll, fan-folded forms.

WORLDWIDE

SERVICE—One of the industry's best networks of authorized sales and service dealers and walk-in service centers.

Features plus the backing of more than

350,000 Centronics printers sold are the assurance that the quiet, reliable 739 is the best printer for the price. At your Centronics dealer. Or write directly for details.

CENTRONICS® PRINTERS

Centronics Data Computer Corp.
One Wall Street
Hudson, NH 03051

CIRCLE 29

Put your business forms on an Apple II™

An innovative software system that speeds the processing and analysis of common business forms on a personal computer. VersaForm applications include:

- Invoicing
- Purchase orders
- Client billing
- Mailing lists
- Order processing
- Sales analysis
- Personnel records
- Inventory records

**Approved
Corvus
Versions**

VersaForm

Business Form Processor

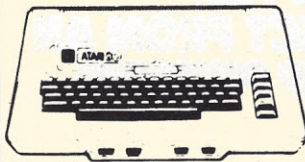


Applied
Software
Technology

15985 Greenwood Rd.
Monte Sereno, California 95030
(408) 395-1541

CIRCLE 109

ATARI HOME COMPUTERS



ATARI 800
 16K ... \$679
 32K ... \$749
 48K ... \$819

410 Recorder	\$76.00
810 Disc Drive	\$449.00
822 Printer	\$269.00
825 Printer	\$629.00
830 Modem	\$159.00
820 Printer	\$269.00
850 Interface	\$169.00
New DOS 2 System	\$29.00

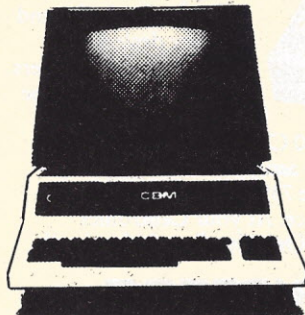
CX30 Paddle	\$18.00
CX40 Joy Stick	\$18.00
CX853 16K RAM	\$89.00
Microtek 16K RAM	\$75.00
Microtek 32K RAM	\$159.00
Ramdisk (128K)	\$539.00
One year extended warranty	\$50.00



ATARI 400
 16K... \$329
 32K... \$478
 48K... \$555

481 Entertainer	\$83.00
482 Educator	\$130.00
483 Programmer	\$57.00
484 Communicator	\$344.00

SOFTWARE BY:	
ATARI	VISICORP
ATARI PRG. EXCH*	VERSAWRITER
DATA SOFT	ASSIMILATED SYSTEMS
J.J.K.	AVALON HILL
K-BYTE	ON LINE
AXLON	PERSONAL SOFTWARE

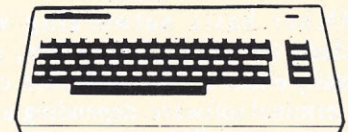


CBM 8032 \$1069



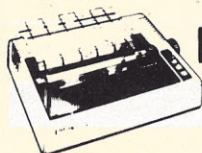
4032	\$969.00
4016	\$769.00
8096 Upgrade Kit	\$399.00
Super Pet	\$1599.00
2031	\$529.00
8050	\$1299.00
4040	\$969.00
8300 (Letter Quality)	\$1799.00
8023	\$769.00
4022	\$599.00
Pet to IEEE Cable	\$37.00
IEEE to IEEE Cable	\$46.00
Tractor Feed for 8300	\$240.00
8010 Modem	\$229.00

SOFTWARE	
COMMODORE	PROFESSIONAL SOFTWARE
MAGIS	AVALON HILL
	CREATIVE SOFTWARE
	BPI
	VISICORP



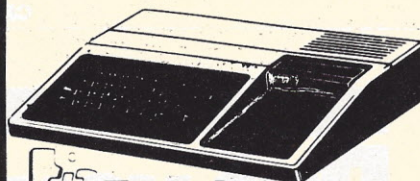
VIC 20 \$259

Vic 6 Pack Program	\$44.00
VIC1530 Commodore Datasette	\$69.00
VIC1540 Disk Drive	\$499.00
VIC1515 VIC Graphic Printer	\$339.00
VIC1210 3K Memory Expander	\$32.00
VIC1110 8K Memory Expander	\$53.00
VIC1011 RS232C Terminal Interface	\$43.00
VIC1112 VIC IEEE 488 Interface	\$86.00
VIC1211 VIC 20 Super Expander	\$53.00



PRINTERS

Centronics 739-3	\$619.00
Centronics 739-1	\$519.00
Diablo 630 Special	\$1799.00
Epson	
MX70	\$359.00
MX80	\$469.00
MX80FT	Call
MX100	Call
NEC	
8023	\$549.00
7730	Call
7720	Call
7710	Call
Okidata	
82A	\$499.00
83A	\$769.00
84	\$1129.00
Citoh Starwriter	
F10-40 CPS	\$1469.00
F10-55 CPS	Call
Paper Tiger	
445G	\$699.00
460G	\$899.00
560G	\$1129.00
Talley	
8024-7	\$1399.00
8024 L	\$1629.00



Texas Instruments
TI-99/4A \$359

PHP 1600 Telephone Coupler	\$179.00
PHP 1700 RS-232 Accessories Interface	\$179.00
PHP 1800 Disk Drive Controller	\$239.00
PHP 1650 Disk Memory Drive	\$389.00
PHP 2200 Memory Expansion (32K RAM)	\$319.00
PHA 2100 R.F. Modulator	\$43.00
PHP 1100 Wired Remote Controllers(Pair)	\$31.00
32K Expansion	\$329.00
PHP Printer Solid State	\$319.00

XEROX®

Xerox 820	
System I 5 1/4"	\$2450.00
System II 8"	\$2950.00
CPM 5 1/4"	\$169.00
Word Processing	\$429.00
Super Calc	\$269.00

Monitors

Amdex 12" B&W	\$139.00
12" Green	\$149.00
13" Color	\$349.00
Sanyo 12" B&W	\$259.00
12" Green	\$269.00
13" Color	\$449.00
TI 10" Color	\$349.00

Terminals

Televideo	
910	\$579.00
912C	\$699.00
920C	\$749.00
950	\$939.00
Call for computers	
Zenith Z19	\$749.00
Adds	\$549.00

Modems

Novation Auto	\$239.00
D Cat	\$169.00
Cat	\$159.00
Hayes	
Smart	\$239.00
Livermore Star	\$119.00

 — NO RISK, NO DEPOSIT ON PHONE, CREDIT CARD OR C.O.D. ORDERS —

east computer mail order west
800-233-8950 800-648-3351

477 East Third Street
 Williamsport, PA 17701
 (717) 327-9575
 Patricio Habla Espanol

HOW TO ORDER:
 Phone orders invited or send check or money order and receive
 free shipping in the continental United States. PA residents add
 6% sales tax. Add 3% for VISA or MC. Equipment subject to price
 change and availability without notice.

P.O. Box 6689
 State Line, Nevada 89449
 (702) 588-5654
 Franco Habla Espanol

INTERVIEW

INTERVIEW

(continued from page 24)

years? The answer to this question will tell you what software you want. The software will determine what hardware you want and that will tell you which technology to get. I think that's the sequence. Decide the software, decide the hardware. The other approach is to say "I'm going to buy a Commodore. What can I do with it?" This is a good way to get an interested person to part with his money, but it's not an advantage in the long run.

PERSONAL COMPUTING: Let's say the consumer is a knowledge worker in a large corporation. The first thing he should decide is what does he want to do with his computer three years from now?

Gold: During the life of the machine. Do you want to do some analysis, word processing, telecommunications, graphics? You have to know how much work you want to do on the unit. For instance: Let's say you know that all you're going to do is maintain natural analysis for your clients who are stock brokers. First of all, you probably don't need to create log reports. You don't have to worry about hard copy. You probably don't want to do word processing.

But you probably want a very high degree of security because it's a fickle industry and when stockbrokers leave, normally they don't leave their efforts lying around on a company hard disk.

PERSONAL COMPUTING: So what equipment does our hypothetical person buy?

Gold: You might say that an Apple II with simple non-high resolution graphics and VisiCalc will meet all of the expectations for that job. And if our imagined person knows that he wants to be doing word processing, that would immediately steer him to one of the wider screens. If he wants to do large reports it might steer him

towards a system with a hard disk. But by no means would he ever worry about how many bits to get. Because the number of bits really is not a very interesting parameter to induce. I look upon the 16-bit technology as being able to do really nothing for a personal computer anyway, as opposed to a multi-user system. It's important to make that distinction. But for a personal computer, which is a one-person-to-one-machine relationship, the 16-bit machine is really going to allow things to be done cheaper and faster.

PERSONAL COMPUTING: And will it also allow more things to be done?

Gold: No. It's going to be cheaper because the software can be developed totally at high-level languages. Essentially what 16-bit technology allows one to do is to use the new low-cost memory—the 64k chips, the 56k chips that are coming out. With an 8-bit microprocessor, it's almost impossible to use them.

But certainly from my point of view the question is one of economics. I believe that within a year or two the 16-bit systems, complete with software, will be more economical. Also there will be more software for them. That's why they will become successful, not because they can walk on water or do things in one-tenth the time. That's not where the advantage is going to come from.

PERSONAL COMPUTING: Would you say that these 16-bit machines will supplant the 8-bit machines?

Gold: In terms of becoming the predominant new systems purchase, sure. I mean there is never going to be a reason to throw out a well-running solid Vector Graphic or Altos system because the IBM machine won't run any faster.

But 16-bit systems won't have the reliability, or the right software until probably towards the end of 1982. That's when the new technology will start to get the variety of richness of application.



DISCOUNT & BONUS COUPONS

for
PRINTERS, DISK DRIVES, DISKETTES,
SOFTWARE, BOOKS
and MORE!

No gimmicks! For BIG SAVINGS on top-quality products from well-known suppliers, just circle **124** on your Reader Service Card and mail it today, or send your name and address to:

FREE COUPONS
P.O. Box 32010
Cleveland, Ohio 44132

NOTE: There is absolutely nothing phony about this offer. The companies extending these unusual bargains want and appreciate your business. The least expensive method of introducing top-quality products is by direct mail. The companies save money... and so do you. No tricks, no obligation. Just good business...

CIRCLE 124

Your personal income tax report, made easy...



TAX• MANAGER

FOR
APPLE II
48K

- Computes and prints out the 1040 form
- 15 supporting forms and schedules
- Yearly updates of the program
- Automatic global recalculations of entries; recalculations linked from schedule to schedule, schedule to form.

Don't get confused about which supporting forms and schedules you should file — use Tax-Manager.

Avoid paying penalties on income you didn't know you should have reported — use Tax-Manager.

Don't even think of the days necessary for compiling, calculating, checking and rechecking — use Tax-Manager.

Be sure your taxes are calculated with the right tax table and rate schedule —

use Tax-Manager.

Don't get depressed about having to spend hours copying figures from work sheets to forms — use Tax-Manager.

Manage your personal tax situation to your best advantage — use Tax-Manager.

It is more than just a computer-aided, tax filing system and goes far beyond calculating taxes and preparing and printing the returns. It consists of a Tax Guide, Tax Checklist and Tax Preparation

that, together, give you a complete tax management system.

This program is user-friendly and comes with a well-written manual so that even computer novices will find working with Tax-Manager easy. Our introductory price is \$150 and it's deductible.



micro-lab for smart working software

2310 Skokie Valley Road • Highland Park, IL 60035 • 312-433-7550 800/323-9083

See your Micro lab dealer.

ALABAMA
Huntsville
Anderson Computers
Mobile
Computerland/Mobile

ARIZONA
Phoenix
Computerland/Phoenix
Scottsdale
Desert Computer

CALIFORNIA
Bakersfield
Burbank
Computer World/Burbank
Cerritos
Byte Shop/Cerritos
Chatsworth
Opportunities, Inc.
El Toro
Wabash Apple
Software

Fresno
National Computer
Ctr., Inc.
Hayward
Computerland/Hayward
Huntington Beach
Sun Computers
Los Altos
Computerland/Los
Altos
Malibu
Microcomputing
Mt. View
Microage Computer
Store

Newport Beach
Computerland
Palmdale
Computers Made
Easy
Sacramento
Capitol Computer
Systems
San Jose
Computerland/San
Jose
Small Business
Assistance
Santa Clara
Affordable Computer
Sys.

Santa Monica
Apple Cyber
Santa Rosa
Santa Rosa Computer
Stockton
Nanci's Software
Torrance
Net Profit Computers
Van Nuys
Computer World
Yucaipa
Yucaipa Computer
System

COLORADO
Boulder
Computer Connection
Colorado Springs
Computer Mart
Computerland/Col
Springs
Evergreen
Computer Video
Concepts

CONNECTICUT
Hamden
Computerland/New
Haven
New London
Computer Lab

Norwalk
Micro Computer Store
Southington
A M Computer
Products
Westport
Computerworks
Windsor Locks
The Computer Store

WASHINGTON DC
Washington
The Program Store

FLORIDA
Boca Raton
Computerland/Boca
Raton
Clearwater
Computer Work
Cocoa Beach
Creative Computer
Service
Coral Gables
International
Computer
Ft. Lauderdale
Franklin Ed. Serv.
Ft. Meyers
Computerland/Ft.
Meyers
Ft. Walton Beach
Tampico Lab Inc.
Gulf Breeze
Computer Store/Gulf
Breeze
Holly Hills
Mini Concepts
Naples
The Other Phone
Store
Palm Beach
Computerland/Palm
Beach
Palmetto
Natural Systems
Computers
Plantation
Turn Key Mini
Computer
Sarasota
Computerland/Sar-
asota
West Palm Beach
Computer
Center/Palm Beach

GEORGIA
Symrna
Computerland/Atlanta

HAWAII
Kailua
Computer Mkt.

IOWA
Ames
Beacon Electronics
Bettendorf
Memory Bank Inc.
Des Moines
Computer Emporium,
Inc.
Sioux City
Pflanz Electronics
Waterloo
Computer Center

IDAHO
Boise
Northwest Computer
Center
Idaho Falls
R & L Data Systems
Yost Office

ILLINOIS
Chicago
Computer Room
Erickson
Communications
Multi Media
Education
Decatur
Main Street Computer
Co.
Deerfield
Video Etc.
Edwardsville
Computer Corner
Elmhurst
Computer Junction
Evanston
Nabih's
Glen Ellyn
Computer Center
Morton Grove
Compshop
Naperville
Illini Microcomputers
Niles
Computerland/Niles
Northbrook
Northbrook Computer
Oak Park
Bies. Systems Inc.
Oaklawn
Computerland/
Oaklawn
Rockford
Alpine Computer
Center
Rolling Meadows
Compshop/Rolling
Meadows
Schaumburg
Data
Domain/Schaumburg

INDIANA
Bloomington
Data
Domain/Bloomington
Merrillville
Computerland/
Merrillville
Munster
Meade's Video Comp.
Center
South Bend
General
Microcomputer

KANSAS
Overland Park
Computerland/
Overland
Personal Computer
Center
Reading
Midwest Research
Con.
Topeka
Computerland/Topeka

MASSACHUSETTS
Burlington
Computer Store
Charlestown
Computer City

MASSACHUSETTS
Burlington
Computer Store
Charlestown
Computer City

East Longmeadow
The Small Computer
Co.
Sudbury
The Computer
Store/301
The Computer
Store/Mclean

Watertown
Microcon Software
Ctrs.
MARYLAND
Annapolis
Computers Etc.
Baltimore
Muse Computer
Center
Columbia
Adca
Rockville
Computerland/
Gaithersburg
Severna Park
The Computer Forum

MAINE
Portland
Harper Electronics
MICHIGAN
Kentwood
Computerland/Grand
Rapids
Willman
Tri-State Digital Prod.

MINNESOTA
Marshall
Slossman &
Associates
Minneapolis
Micronage Computer
Store
Personal Business
Systems
Team Central Inc.
St. Paul
Schaak Electronics
Intech, Inc.

MISSOURI
Clayton
Forsyth Computers
Kansas City
Computer Work Shop
Springfield
Computer Mart
St. Charles
United Computer
St. Louis
Carleton Agency Co.
Futureworld Inc.

MISSISSIPPI
Jackson
Mississippi Micros,
Inc.
NEBRASKA
Lincoln
Alcom
Gering
Par Handle Tech
Kearney
Computer Hardware
Omaha
Abacus, Inc.
Computerland/Omaha

NORTH CAROLINA
Burlington
Nova Scientific Corp.
Charlotte
Computer Room Inc.
Standard Computer
Greensboro
Computer Shop

NORTH DAKOTA
Grand Fork
Team Electronics
Minot
Team Electronics
NEW HAMPSHIRE
Portsmouth
The Think Tank

NEW JERSEY
Cherry Hill
Computerland/
Cherry Hill
Englewood
American Business
Product
Englishtown
Computer Madness,
Inc.
Marlton
Midas Data Systems
Morristown
Computerland/
Morristown
North Plainfield
Boise Office Equip.
Paramus
Computer Universe
River Edge
Software City
Summit
Stonehenge Computer
Shop

NEW MEXICO
Alamogordo
Personalized Comp.
Serv.
NEVADA
Las Vegas
Century 23

NEW YORK
Albany
Computer Room
Buffalo
Computerland/
Buffalo
Carle Place
Computerland/
Nassau
Garden City
The Computer
Factory, Inc.
Kingston
Computer Shop
Melville
Future Vision

New Hyde Park
Berliner Computer
Center
New Rochelle
Calculator &
Computer Center
New York
Computer Era
Dadel
Morris Decision
Systems
Computer Factory
Pleasantville
Micro Center

Sunburst Communications
Rochester
The Computer Center
Syracuse
OmniFax Computer
Stores
Wappinger Falls
Mr. Computer

OHIO
Cincinnati
21st Century Shop
Computerland/
Cincinnati
Columbus
Microage

OKLAHOMA
Lawton
Computer Tech, Inc.
Tulsa
Computerland/
Tulsa
OREGON
Creswell
Computertutor
Eugene
Custom Computers

PENNSYLVANIA
Allentown/
Whitehall
Computerland
Dresher
Computerland/
Dresher
Erie
Erie Computer
Mechanicsburg
Computerland/
Harrisburg
Monroeville
Computer
Workshope
Paoli
Computerland/
Paoli
Philadelphia
Caldwell Computer
Corp.
Pittsburgh
The Computer House
Whitehall-Allentown
Computerland/Lehigh

RHODE ISLAND
Providence
The Computer Store
SOUTH CAROLINA
Rockhill
Gismo Computer

TENNESSEE
Memphis
Computer Lab
Opus II
TEXAS
Abilene
Computer
Shop/Abilene
Arlington
Computer Port
Arlington
Computer Port
Austin
The Computer center
Computer 'N Things
Beaumont
Computer Concepts

College Station
Young Electronics
Dallas
Computeria

Houston
Computer Center
Computer City/
Houston
Computercraft/
Houston
Marshall
Marshall Business
Corp.
Odessa
Computer Patch
Richardson
Compshop
Micro Age Computer

San Antonio
Computer Solution
R. L. Gales Electric
The Computer Shop
Tyler
Computerland/
Tyler
Waco
Computer Solution
Inc.
Wichita Falls
The Computer Store

UTAH
Ogden
Computer Specialists
Salt Lake City
Computer Solutions
VIRGINIA
Springfield
Computers, Etc.

WASHINGTON
Bellingham
Western Micro
Computer C.
Federal Way
Software Serv.
Port Angeles
Anges Computer,
Inc.
Seattle
Empire Electronics
Inc.
Spokane
Personal Comp. Inc.
Yakima
Cliff Miller's Inc.

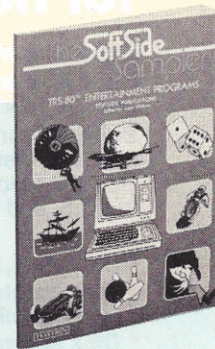
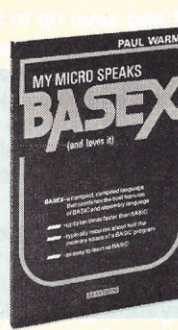
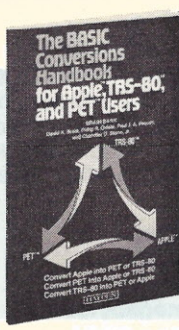
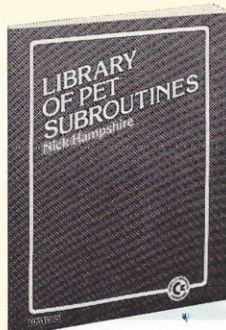
WISCONSIN
Appleton
Computer World/
Appleton
Janesville
Team Electronics
Lacrosse
Midwest Computer
Madison
Computerland/
Madison
Laboratory
Consulting, Inc.
Milwaukee
Computerland/
Milwaukee
Computers Plus
North Shore
Computers Inc.
Team Electronics/
Milwaukee

© 1981, Micro Lab, Inc.

HAYDEN—FOR THE BEST MICROCOMPUTING BOOKS AVAILABLE

MY MICRO SPEAKS BASEX (And Loves It)

(Warne) An in-depth examination of BASEX, a versatile new language for 8080 type microcomputers, combining the best features of BASIC and executable machine language code. **5187-5, \$9.95** BASEX Compiler/Loader & Sample Programs, **TRS-80 tape, 07203, \$34.95** Book and tape Set, request 5189-1



BASIC COMPUTER PROGRAMS FOR BUSINESS

(Sternberg) A must for small businesses and entrepreneurs using micros! Provides a wealth of practical business applications each documented with a description of its functions and operation; a listing in BASIC, a symbol table, sample data, and one or more samples. **5162-X, \$10.95**

New! THE BASIC CONVERSIONS HANDBOOK FOR APPLE™, TRS-80™, AND PET™ USERS

(Brain Bank) Convert Apple II and PET programs to TRS-80, TRS-80 and PET programs to Apple II, and TRS-80 and Apple II programs to PET. Equivalent commands are listed for TRS-80 BASIC (Model I, Level II) Applesoft BASIC and PET BASIC, as well as variations for the TRS-80 Model III and Apple Integer BASIC. Also describes variations in graphics capabilities. **5534-X, \$7.95**

BASIC COMPUTER PROGRAMS FOR THE HOME

(Sternberg) Contains over 75 practical home application programs helpful to the novice or experienced owner in increasing the usefulness of any home computer. Each program is documented with a description of its functions and operation, a listing in BASIC, a symbol table, sample data, and samples. **5154-9, \$10.95** Also available on Apple II Disk, **10509, \$24.95**

Available at your
local computer store

Order Today!

Hayden Book Company, Inc.
50 Essex St., Rochelle Park, NJ 07662

☐ Please send me the book(s) checked on 15-day FREE examination. At the end of that time, I will send payment, plus postage and handling, or return the book(s) and owe nothing. On all prepaid, Visa, or Master Card charge orders, publisher pays postage—same return guarantee. Resident of NJ and CA must add sales tax. Offer good in USA only. Prices subject to change without notice.

☐ 1050-8 ☐ 5154-9 ☐ 5189-1
☐ 1051-6 ☐ 5162-X ☐ 5496-3
☐ 5149-0 ☐ 5187-5 ☐ 5534-X

☐ PAYMENT MUST ACCOMPANY ALL SOFTWARE ORDERS. Enclosed is my check, money order, or Visa/Master Card charge account number. Please send me the software checked.

☐ 07203 ☐ 11620
☐ 10509 ☐ 11720

Visa/MasterCard # _____

Expiration Date _____ MC Interbank # _____

Signature _____

Name _____

Address _____

City/State/Zip _____

PC 4/82-004

New! PET™ GRAPHICS

(Hampshire) Written to instruct the PET user on how to program graphic displays, the author provides the user with a collection of machine-language subroutines. Includes simple graphic display routines, fine resolution plotting, interfacing a light pen with the PET, and much more. **1051-6, \$16.95** All programs included in this book are available on PET Disk. **11620, \$25.00**

New! LIBRARY OF PET™

SUBROUTINES (Hampshire) The author explains the simplicity of writing a set of application programs, given a logical framework to build from and a few standard subroutines. **1050-8, \$14.95**

All subroutines in this book are also available on PET Disk. **11720, \$25.00**

For Orders and Inquiries
Call Toll Free

HAYDEN HOTLINE
1-800-631-0856

THE SOFTSIDE SAMPLER: TRS-80™ ENTERTAINMENT PROGRAMS

(ed. Witham) A sampling of SoftSide magazine's more exciting game programs are compiled in a single book. Test your nautical skills with programs like **Sound the Horn** and **Battleship**. . . partake in a nine man wrestling contest. . . jump a motorcycle over ten barrels at a time! **5496-3, \$8.95**

New! CODES, CIPHERS, AND COMPUTERS: An Introduction to Information Security

(Bosworth) Describes the fundamentals of secret communication and provides an understanding of computer security through computer cryptography. It details and illustrates traditional cryptography techniques developed before computers and discusses more recent concepts for the highest levels of information and data security. **5149-0, \$13.95(t)**

Apple is a registered trademark of Apple Computer Co., Inc.; TRS-80 is a registered trademark of Radio Shack, Inc.; PET is a registered trademark of Commodore Business Machines, Inc.; none of which are affiliated with Hayden Book Company, Inc.

Hayden
Book Company, Inc.

Free Heathkit Catalog

featuring computers,
peripherals and software
for home and business.

Build it yourself and save up to 50%.

Build it yourself and learn – know your system from the inside out, grow as your skills grow, change as your needs change.

Build it yourself the easy Heathkit way – with step-by-step assembly manuals, friendly over-the-phone assistance and 65 convenient Heathkit Electronic Centers* – selling and servicing our computers in the U.S. and Canada. See your telephone white pages for locations.

- Complete, integrated computer systems
- Peripherals – including video terminals, letter-quality printers, color graphics
- Disk storage systems, up to 12 megabytes
- Three operating systems, including CP/M
- Innovative software – including word processing, SuperCalc electronic spreadsheet and Peachtree business programs
- Self-instructing programming courses from Heathkit/Zenith Educational Systems
- Accessories and supplies

*Heathkit Electronic Centers in the U.S. are units of Veritechnology Electronics Corporation.



Send today for your
FREE HEATHKIT CATALOG

If coupon is missing, write
Heath Co., Dept.
352-882, Benton
Harbor, MI 49022

In Canada, write
Heath Co., 1480
Dundas St. East,
Mississauga,
Ontario L4X 2R7



Please send my free Heathkit Catalog. I am not currently receiving one.

Send to: Heath Co., Dept. 352-882
Benton Harbor, MI 49022

Name _____

Address _____

City _____ State _____

CP-207 _____ Zip _____

ADVANCED

PROGRAMMING

(continued from page 80)

gram to end or start over. This can be done by asking the user if he wishes to complete another transaction, which can be accomplished by adding the following lines to the program:

```
100 PRINT "Do you wish to make  
another transaction?"  
110 INPUT A$  
120 IF A$="yes" GOTO 10  
130 PRINT "Good Bye!"  
140 END
```

The program is now complete with a conditional loop; that is, execution will loop from line 10 to line 120 until the user answers anything other than "yes" to the question asked at line 100.

Although this program is a good programming exercise, it is not intended to be the solution to your checkbook problems. It is possible, though, that with some expanded capabilities, it might be helpful. From this exercise it should be possible to see how parts of many common applications programs work.

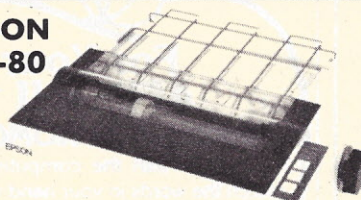
You have probably used automated bank tellers or a word processor at work. You should now have some insight into how these programs are created. BASIC might not be used at your local bank, but lines of code analogous to PRINT statements are used. So the next time you see a computer program running, think about where loops, branches and input structures are being used.

Editor's note: Take an even closer look at the programming process next month, when we explore two simple programming problems. The mental processes you will use in solving these problems will illustrate the kind of thinking that is both useful and necessary when programming—the creative process of problem solving and the design of structured solutions. You'll learn that expressing an idea on paper first makes it easier to cast that idea into more obscure programming code.

APRIL SPECIALS

WE CARRY THE COMPLETE LINE OF ATARI SOFTWARE, PERIPHERALS AND ACCESSORIES.

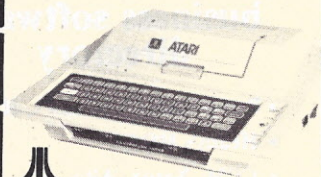
EPSON MX-80



INTERFACES & CABLES
IEEE \$55. RS-232 \$70.
APPLE INTERFACE & CABLE \$90.
TRS-80 CABLE \$35.

\$439.00

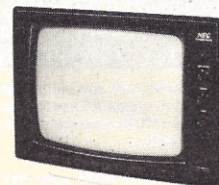
ATARI 400 16K



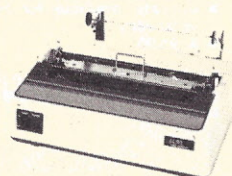
\$339.00

PERSONAL COMPUTERS

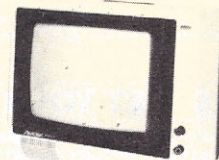
Televideo 925	849.00	NEC 3510 Spinwriter	\$1750.00
Televideo 950	929.00	NEC 3515 Spinwriter	1795.00
CBM 8032 Computer	1149.00	NEC 3530 Spinwriter	1750.00
CBM 8050 Disk Drive	1349.00	NEC PC-8023 Printer	629.00
CBM 4032 Computer	975.00	NEC 7710 Spinwriter	2345.00
CBM 4040 Disk Drive	975.00	NEC 7720 Spinwriter	2695.00
CBM 4022 Printer	649.00	NEC 7730 Spinwriter	2345.00
CBM VIC-20	269.00	NEC JC 1201 M(A) — Color 12" monitor	359.00
Microtek 16K Ramboard for Atari 800	79.00	Okidata Microline-82A	499.00
Microtek 32K Ramboard for Atari 400 and 800	149.00	Okidata Microline-83A	729.00
Qume Sprint 9/45 (Full Panel)	2095.00	Diablo 630	1995.00
Atari 810 Disk Drive	449.00	M & R Sup-R-Terminal	279.00
Atari 850 Interface	169.00	Microsoft Soft Card (Z-80)	279.00
Atari 830 MODEM	159.00	Microsoft Ramcard 16K for Apple	149.00
Atari 800 16K	749.00	Hazeltine 1420	799.00
Epson MX-70	319.00	Amdek 100 G	169.00
Epson MX-80 FT	549.00	Anadex DP-9500/9501	1249.00
Amdek Video-300	199.00	Televideo 910	559.00
Hayes Micromodem II (Apple II)	299.00	Televideo 912C	669.00
Sanyo 9" B & W	189.00	Televideo 920C	689.00



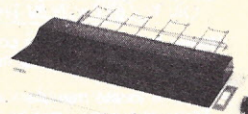
NEC GREEN
12" MONITOR JB 1201M
\$159.00



OKIDATA MICROLINE 80A
MATRIX PRINTER
\$329.00



AMDEK COLOR-1 MONITOR
\$339.00



EPSON MX-100 FT PRINTER
\$729.00

CALL TOLL FREE!

EAST COAST
1-800-556-7586
COMPUTER SHOPPING CENTER INC.

12 Meeting Street
Cumberland, RI 02864
1-401-722-1027
TELEX 952106

WEST COAST
1-800-235-3581
COMPUTER SHOPPING CENTER INC.

3533 Old Conejo Rd. #101
Newbury Park, CA 91320
1-805-499-3678
CA. TOLL FREE 1-800-322-1873
TELEX 182889

COMPUTER SHOPPING CENTER

We Accept C.O.D.'s • Stock Shipments Same Day or Next • No Surcharge for Credit Cards
• All Equipment Factory Fresh w/MFT Warranty • We Carry the Complete Line of Personal Software
• Prices do not Reflect Shipping Charges
Rhode Island and California Residents please add 6% Sales Tax

PRICES ARE SUBJECT
TO CHANGE
WITHOUT NOTICE

FREE business software directory

- Radio Shack's Model I, II, III
- Heath's HDOS
- CPM: Xerox, Alto...
- IBM PC

Data base manager, integrated accounting package, inventory, word processing, and advanced mailing list.



Micro Architect Inc.
96 Dothan St.
Arlington, MA 02174

CIRCLE 132

VOICE SYNTHESIZER WITH INTERACTIVE TELEPHONE INTERFACE

For APPLE II™ compatible dial-up voice response and remote data-base access arrangements, consider a V100 series design from **VYNET CORPORATION**.

- Direct connect, auto-dial/answer
- Control via Touch-Tone™ detection
- Allophone (LPC) based voice synthesizer
- Includes 1,000 word vocabulary
- Editor for custom vocabulary
- Extensive application software
- Programmable buffered port
- Upgrade available for high quality LPC vocabulary
- \$395.00

Telephone interface may be purchased without synthesizer. TRS-80™ and IBM versions available soon.

VYNET CORPORATION
2405 QUME DRIVE
SAN JOSE, CA 95131
(408) 942-1037

CIRCLE 135

\$ GET YOUR SHARE \$

Join the thousands of winners who have built on their computer interest to create a successful data processing-based business, and:
SHARE IN THE MINI/MICROPROCESSING BOOM
Read this exciting new book:

MAKING IT IN DATA PROCESSING - ON YOUR OWN IN THE EIGHTIES

Written by experts in the computer business, this book contains all you need to get started including:

- How to locate manufacturers who will help finance your new venture.
- What types of businesses are available and are best for you.
- Actual sources of Venture Capital looking for new businesses.
- Complete guides to pricing, sales promotion, advertising, publicity, and marketing.
- Dozens of sources of information to help you build your business.

To order, just clip this ad and send with only \$19.95 to:

THE SEABIRD PRESS
PO Box 461, Lexington, MA 02173
Full 30 day money back guarantee

CIRCLE 123

For Your APPLE II + FISHING FOR HOMONYMS

Take turns with the computer trying to match the words in your hand with homonyms. Played like the card game 'Fish'.

- Contains **over** 150 pairs of homonyms
- Large, easy-to-read, colorful letters
- Sound effects

Requires 48K - Applesoft in ROM
DOS 3.2/3.3 \$25.00

Ask for it
at your
local computer store

I.H.E.S.I.S.

P.O. Box 147
Garden City, MI 48135
(313) 595-4722

Please add:
\$1.50 shipping/handling
\$1.50 C.O.D.
Write for Free Catalog
Dealer Inquiries Welcome

CIRCLE 133

for POCKET COMPUTERS

Game Pac 1: OLD FAVORITES

Five proven games, updated with exciting new features. Fun for all! PLANET-Land on any planet. ZILCH-Bagles, 1-9 digit numbers. HILO-Nifty version of Stars. COINS-Computer "learns" to win. WINNER-You Lose! Includes complete notes and listings

\$9.
with cassette \$14.

BEGINNERS GUIDE TO PROGRAMMING

the Sharp/Radio Shack Pocket Computer

It's fast, fun and easy. You'll understand every word and be amazed how easily you progress. No other method brings positive results so quickly

\$19.

YOU AND YOUR DOLLARS: ALL ABOUT INTEREST

99 basic questions answered with 17 dynamite programs. Includes variable and fixed rate home loans. Also annuities, present and future value, notes and contracts, cash flow analysis and much more.

\$19.
with cassette \$33.

(Remit in U.S. funds. Add \$2. for first class delivery. Add \$3. if outside U.S. Calif. add 6% sales tax.)

AND WE HAVE OTHERS! For a copy of our catalog, circle our number on your bingo card or write directly.

HANCO Software (formerly XCEL)

P.O. Box 4772D, Sylmar, CA 91342
(213) 367-4366

CIRCLE 136

POCKET COMPUTER

NEWSLETTER

A NEWSLETTER FOR POCKET COMPUTER USERS

This timely, compact publication provides up to the minute information on pocket computers, including models such as the Radio Shack TRS-80 PC, Sharp Electronic's PC-1211, the Casio FX-702P, Panasonic's RL-H1000, and others as they are announced. We only cover pocket computers that are capable of executing a high level language such as BASIC.

- ☐ Up to the Minute News ☐ Product & Equipment Reviews
- ☐ Important Operating Tips ☐ Practical Programs ☐ More

By Subscription Only: for a calendar year period (January-December). You get all issues published to date for the calendar year in which you subscribe, at the time you subscribe.

MC/VISA Phone Subscriptions: (203) 888-1946

- ☐ 1981/82 Charter Subscriber (Issues 1 - 20). \$40.00 in U.S. (U.S. \$48.00 to Canada. U.S. \$60.00 elsewhere.)

- ☐ 1982 Regular Subscriber (Issues 11 - 20). \$30.00 in U.S. (U.S. \$36.00 to Canada. U.S. \$45.00 elsewhere.)

- ☐ Sample issue. \$3.00 in U.S. (U.S. \$4.00 elsewhere.) *Due to credit card minimum, this item cannot be charged.

Orders must be accompanied by payment in full. We do not issue invoices for the POCKET COMPUTER NEWSLETTER.

Thank you for your remittance.

Name: _____
Addr: _____
City: _____ State: _____ Zip: _____
MC/VISA #: _____ Expires: _____
Signature: _____

POCKET COMPUTER NEWSLETTER
35 Old State Road, Oxford, CT 06483

CIRCLE 139



GENERAL BUSINESS PROGRAMS FOR TRS-80

MAILSOME—A program which will interface our 'KWIKRITE' and our 'CUSTOMER' to allow mass mailings or selective mailings to your accounts. Requires CUSTOMER and KWIKRITE. For this module only, Model I or Model III **\$39.50**. Special for all 3, CUSTOMER, KWIKRITE, MAILSOME **\$129.50**.

Many other programs available. REAL ESTATE PROGRAMS for escrow accounting, closing statements, investment. Don't be deceived by our LOW PRICES! This is quality software with good instruction manuals. FREE comprehensive catalog available upon request!

SIMPLIFIED SOFTWARE SERIES by

M. B. Rowe & Associates
118 Third Ave., N.W., Box 1192
Hickory, N.C. 28601

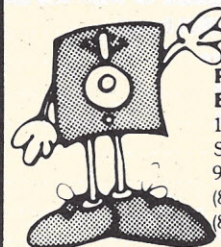
Include \$2.00 postage and handling each program

MASTERCARD and VISA accepted
DEALER INQUIRIES INVITED

CIRCLE 134

MEMOREX FLEXIBLE DISCS

**WE WILL NOT BE UNDER-
SOLD!!** Call Free (800)235-4137
for prices and information. Dealer
inquiries invited and C.O.D.'s
accepted.



PACIFIC EXCHANGES

100 Foothill Blvd.
San Luis Obispo, CA
93401. In Cal. call
(800)592-5935 or
(805)543-1037

CIRCLE 137

Being the 3rd edition of the 1st
catalogue devoted exclusively to
PET and CBM owners everywhere

**Skyles
Electric
Works**

**So you own
a Commodore
PET or CBM and you
haven't received the
latest edition of the one and only
catalogue in the whole wide world
devoted exclusively to PET and CBM
products?** The new Skyles catalogue
over 70 items designed for your com-
puter. All kinds of good stuff. From
Skyles Electric Works, the oldest and
largest company for PET and CBM
computers. So, send for your cata-
logue now. It's hot off the press.
And it's **FREE**.
Skyles Electric Works
231E South Whisman Rd.
Mt. View, CA 94041

CIRCLE 140

**PERSONAL
COMPUTER SOFTWARE
for
EXECUTIVES and MANAGERS**

- Name/Address/Key Information
- Personal Schedule
- Corporate Schedule
- Document Tracking
- File Indexing Schema
- Tickler File
- Questionnaire Tabulating

Any three for \$150 - All seven for \$250.
Functional, well engineered software in
the Pascal programming language for
Apple II and TRS-80 Model II com-
puters.

SOFTWARE CONSULTING SERVICES
901 Whittier Drive, Allentown, Pa. 18103
(215) 797-9690
ATT. Martha Cichelli

*(TM) Apple Computer Co., **(TM) Tandy Corp.

CIRCLE 141

**NEC®
High Yield
Multistrike
Replacement
Cartridge Ribbons**



**40%
more
characters**

Introducing the NEC® High Yield
Multistrike replacement cartridge ribbon
manufactured completely by Aspen
Ribbons, Inc. Our tests indicate an
average yield of approximately 330,000
characters per cartridge—an increase of
100,000 characters per cartridge over our
standard NEC® compatible cartridge.

Call for our low, low prices. Color
ribbons are available for an additional
charge.

Aspen Ribbons, Inc. 1700 N. 55th Street
Boulder, Colorado USA 80301-2796
(303)444-4054 Toll Free 1-800-525-0646
Telex 45-0055

CIRCLE 144

CP/M®

BUSINESS SOFTWARE

NEW

Phone Saver™

Will Save You Bucks!

A management system for tracking
long-distance phone calls.
super fast / super easy

INTRODUCTORY OFFER \$75.

Requires CBASIC2.®

Specify 8" or 5 1/4" diskette.

DIGITAL SYSTEMS, INC.

680 Lafayette Road, Hampton
NH 03842 (603) 926-8737

CIRCLE 142

**APPLE
OWNERS**

\$125.00

**SUPER RAM II
16K RAM CARD
FOR APPLE II®**

- ALLOWS YOU TO RUN PASCAL,
PILOT, APPLESOFT/INTEGRAL BASIC
- ADD 16K OF PROGRAMING SPACE
TO VISICALC® AND CPM®
- INCLUDES: 2K ROM SOCKET
- EASY INSTALLATION

*** 2 YEAR WARRANTY
ORDER NOW**

R. H. Electronics

566 Irelan, Bin PS
Buellton, CA 93427
(805) 688-2047

CIRCLE 143

EDUCATIONAL SOFTWARE

For TRS-80, Pet, Apple
& Color Computer

ELEMENTARY	MATH
SCIENCE	HISTORY
GEOGRAPHY	ACCOUNTING
ECONOMICS	BUSINESS ED.
FOREIGN LANG.	FARM RECORDS
GRAMMAR	COIN INVENTORY

Write for FREE Catalogue!

MICRO LEARNINGWARE, Box 2134, N. Man-
kato, MN 56001 (507) 625-2205

VISA & MASTER CARD ACCEPTED

We pay 15% royalty for Educational Programs
listed with us.

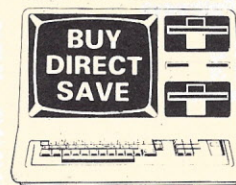
TRS-80 is a registered Trademark of TANDY
CORP. Pet is a trademark of Commodore Bus.
Machines. Apple is a trademark of Apple Com-
puter Co.

CIRCLE 145

TRS-80™ DISCOUNT

PERSONAL COMPUTERS

WE CARRY THE FULL
LINE OF TRS-80's



BUY DIRECT

AT WHOLESALE PRICES

MODEL II

26-4002 64K I Drive. **\$3279**

Ask About Hard Drives

MODEL III

26-1062 16K. **\$819**

26-1066 48K with

2 Drives, RS232. **\$2049**

COLOR COMPUTER

26-3001 4K. **\$309**

26-3002 16K Ext. Basic. **\$455**

26-3003 32K Ext. Basic. **\$569**

WRITE FOR FREE CATALOG

1-800-841-0860 Toll Free

TM-TANDY CORPORATION
FREE COPY OF WARRANTY UPON REQUEST

MICRO MANAGEMENT

SYSTEMS, INC

DEPT. NO. 9

115C Second Ave. S.W. • Cairo, Ga. 31728
912-377-7120 Ga. Phone No.

CIRCLE 117

Moving?

1. For FASTEST service attach old
mailing label in space below

Please allow
6 weeks for
change to
take effect

If mailing label is not available print your old
name and address in this box

2. Print your NEW address here

NAME _____

ADDRESS _____

CITY _____

STATE _____

ZIP _____

3. Mail to: Personal Computing
50 Essex St.
Rochelle Park,
NJ 07662

WE WILL NOT BE UNDERSOLD

CP/M® Software Computer Pathways

Pearl (level 1)	\$ 99/\$25
Pearl (level 2)	\$299/\$40
Pearl (level 3)	\$549/\$50

Digital Research

PL/I-80	\$459/\$35
BT-80	\$179/\$30
Mac	\$ 85/\$15
Sid	\$ 65/\$15
Z-Sid	\$ 90/\$15
Tex	\$ 90/\$15
DeSpool	\$ 50/\$10

Micropro

WordStar	\$319/\$60
Customization Notes	\$ 89/\$na
Mail-Merge	\$109/\$25
WordStar/Mail-Merge	\$419/\$85
DataStar	\$249/\$60
WordMaster	\$119/\$40
SuperSort I	\$199/\$40
Spell Star	\$175/\$40

Microsoft

Basic-80	\$289/\$na
Basic Compiler	\$329/\$na
Fortran-80	\$349/\$na
Cobol-80	\$574/\$na
M-Sort	\$124/\$na
Macro-80	\$144/\$na
Edit-80	\$ 84/\$na
MuSimp/MuMath	\$224/\$na
MuLisp-80	\$174/\$na

Organic Software

Milestone	\$269/\$30
-----------	------------

Supersoft

Diagnostic I	\$ 49/\$20
Diagnostic II	\$ 84/\$20
Disk Doctor	\$ 84/\$20
Forth (8080 or Z80)	\$149/\$30
Fortran	\$219/\$30
Fortran w/Ratfor	\$289/\$35

Unicorn

Mince	\$149/\$25
Scribble	\$149/\$25
Both	\$249/\$50

Data Base

FMS-80	\$649/\$45
dBASE II	\$595/\$50
Access/80	\$699/\$50

Pascal

Pascal/MT+	\$429/\$30
Pascal/M	\$189/\$20

Miscellaneous

SpellGuard	\$299/\$25
The Last One	\$549/\$na
SuperCalc	\$269/\$50
CBASIC-2	\$ 98/\$20
MicroStat	\$224/\$25
StatPak	\$449/\$40
Micro B+	\$229/\$20

Apple Software (Business)

Micropro	
Wordstar	\$269
MailMerge	\$ 99
Wordstar/MailMerge	\$349
SuperSort I	\$159
Spellstar	\$129

Personal Software

Visicalc 3.3	\$229
CCA Data Mgr	\$ 84
Desktop/Plan II	\$229
Visiterm	\$139
Visidex	\$229
Visiplot	\$185



Personal Software (cont.)

Visitrend/Visiplot	\$ 275
Zork	\$ 34

Miscellaneous

Micro Courier	\$ 219
Super-Text II	\$127
ASCII Express	\$ 59

Apple Software (Entertainment)

Wizard & Princess	\$ 28
Mystery House	\$ 24
Flight Simulator	\$ 29
Raster Blaster	\$ 26
Space Eggs	\$ 26
Sargon II	\$ 29
ABM	\$ 22
Micropainter	\$ 29
Apple Panic	\$ 28
Pool 1.5	\$ 26

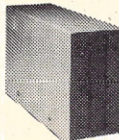


Apple Accessories

Z-80 Softcard by Microsoft	\$ 299
Keyboard Enhancer	\$119
Apple Joystick	\$ 49
Sup-r Mod	\$ 25
CPS Multifunction Card	\$199
Videoterm by Videx	\$249
16K Card by Microsoft	\$159
Sup-r Fan	\$ 39
ALF9 Voice Board	\$149
CCS Cards	\$Call
CCS Parallel Model 7720	\$Call
CCS Serial Model 7710D	\$Call
CCS Centronics Model 7728	\$Call

Disk Drives

For TRS-80* Model 1	
CCI-100 5 1/4", 40 Track	\$ 299
Add-ons for Zenith Z-89	
CCI-189 5 1/4", 40 Track	\$ 389
Z-87 Dual 5 1/4" system	\$ 995
Drives for Z-90	\$Call
External card edge and power supply included. 90 day warranty/one year on power supply.	



Corvus 5M

Corvus 10M	\$3089
Corvus 20M	\$4489
Corvus Mirror	\$5429
Shugart 8" 801R Raw Drive	\$ 699
TANDON 5 1/4" Raw Drive	\$ 399
Power Supplies	\$ Call

Diskettes—Box of 10

Maxell 5 1/4"	\$ 40
Maxell 8"	\$ 45
BASF/Verbatim 5 1/4"	\$26.95
BASF/Verbatim 8"	\$ 36
Plastic File Box—Holds 50 5 1/4" dskts.	\$ 19
Plastic Library Case 5 1/4"	\$ 3
Plastic Library Case 8"	\$ 4
Head Cleaning Diskette	\$ 25
Floppy Saver	\$10.95
Floppy Saver Rings	\$ 6.95

16K RAM Kits

One Kit	\$19.00
Two Kits	\$37.00
200ns for TRS-80*, Apple II, (specify):	
Jumpers	\$ 2.50

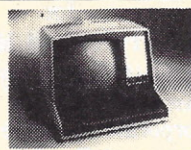
Computer Systems

Atari 400	\$ 359
Atari 800	\$ 699
Call for other Atari products	
Zenith Z89, 48K	\$ Call
Zenith Z90, 64K	\$ Call
Call for other Zenith products	

For fast delivery, send certified checks, money orders or call to arrange direct bank wire transfers. Personal or company checks require one to three weeks to clear. All prices are mail order only and are subject to change without notice. Call for shipping charges.

Terminals

ADDS Viewpoint	\$ Call
Zenith Z-19	\$ 719
Televideo 910	\$ 559
Televideo 920C	\$ 729
Televideo 950	\$ 969



S-100 California Computer Systems

Mainframe	\$ 349
Z80 CPU	\$ 239
64K RAM	\$ 569
Floppy Disc Cntrl	\$ 339
Integrated Sys. w/int. cables, tstd.	\$1975
2P + 2S I/O	\$ 269
4 Port Serial I/O	\$ 249
4 Port Parallel I/O	\$ 179

Casio Calculators

Pocket Comp.	FX702	\$185.00
Desk Print/Calc.	FR100	\$ 79.95
Scientific Calc.	FX8100	\$ 49.95
Game Watch	CA90 Plastic	\$ 49.95
Game Watch	CA901 Steel	\$ 69.95
Calendar Watch	AX210	\$ 59.95

Printers

NEC Spinwriter	
7710 R.O. Ser	\$2395
7710 Ser w/tr.	\$2595
7720 KSR w/tr.	\$2795
7730 R.O. Par	\$2395
7730 R.O. Par w/tr.	\$2595



Epson MX-70

Epson MX-80	\$ Call
Epson MX-80FT	\$ Call
Epson MX-100	\$ Call
Epson Grafix	\$ Call
PaperTiger 560 Gr. & 2K	\$ Call
IDS Prism 80	\$ Call
IDS Prism 132	\$ Call
PaperTiger Access.	\$ Call
Olivetti DY 211 Daisy Wheel	\$ Call
Anadex DP-8000	\$ 849
Anadex DP-9500/01	\$1389

Okidata Microline 80 Fric. & pin feed	\$ Call
Okidata Microline 82A Fric. & pin feed	\$ Call
Okidata Microline 83A 120 cps	\$ Call
Okidata 84 200 cps	\$ Call
Centronics 739	\$ 739
Data South 180 cps	\$ Call

Monitors

Leedex 12" B & W	\$ 119
Leedex 12" Green Screen	\$ 129
Leedex 13" Color	\$ 329
Sanyo 9" B & W	\$ 149
Sanyo 9" Green Screen	\$ 189
Sanyo 12" Green Screen	\$ 249
Sanyo 12" B & W	\$ 239
Sanyo 13" Color	\$ 449
Zenith 13" Color	\$ 349

***** Special of the Month *****

Zenith 12" Green Screen	\$129
-------------------------	-------

Telecommunications

Prentice Star Modem 1-yr. guar.	\$ 125
Univ. Data System UDS103LP	\$ 149
Univ. Data System UDS103JP	\$ 185
Novation Cat	\$ 139
Novation D-Cat	\$ 149
Novation Auto-Cat	\$ 199
Novation Apple Cat II	\$ 299
Hayes Smart Modem™	\$ 249
Hayes Micro-Modem II™	\$ 295
Hayes Chronograph™	\$ 225
CCI Telnet Com. Package	\$ 135

DEALER (NATIONAL/INTERNATIONAL) INQUIRIES INVITED

Send for FREE Catalogue

The CPU SHOP

TO ORDER CALL TOLL FREE 1-800-343-6522

TWX: 710-348-1796 Massachusetts Residents call 617/242-3361

420-438 Rutherford Ave., Dept. PC04M
Charlestown, Massachusetts 02129
Hours 9 AM-8 PM (EST) Mon.-Fri. (Sat. till 5)

Technical Information call 617/242-3361
Massachusetts Residents add 5% Sales Tax
Tandy Corporation Trademark® Digital Research



VISA

Tired Of Your GENERAL LEDGER?

VERSA- LEDGER

FOR YOUR TRS-80 MODEL I, II, III or COLOR COMPUTER • APPLE II • I.B.M. • XEROX • ATARI
ALL MICROSOFT BASIC COMPUTERS

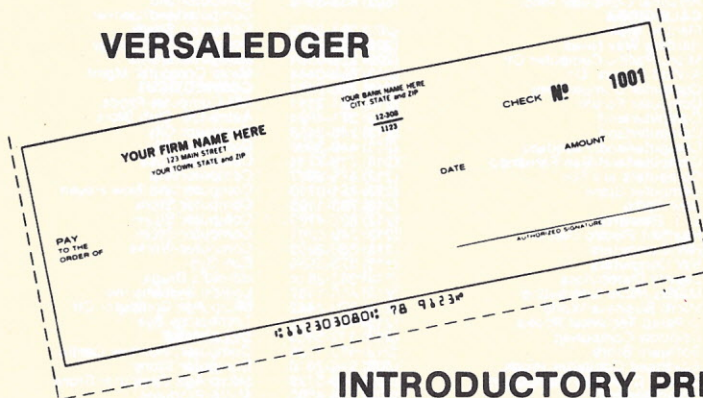
- ★ THE ULTIMATE PERSONAL CHECK REGISTER
- ★ A PROFESSIONAL ACCOUNTING SYSTEM
- ★ A PERSONAL FINANCIAL MANAGER
- ★ A SMALL BUSINESS ACCOUNTING SYSTEM
- ★ A COMPLETE GENERAL LEDGER

HOW IT WORKS

VERSALEDGER is a complete accounting system that grows as you or your business grows. To start, your VERSALEDGER acts as a simple method of keeping track of your checkbook. Just enter your check number, date and to whom the check is made out to. As you or your business grows, you may add more details to your transactions . . . account number, detailed account explanations, etc.

- VERSALEDGER can give you an instant cash balance at anytime. (IF YOU WANT IT TO)
- VERSALEDGER can be used as a small personal checkbook register. (IF YOU WANT IT TO)
- VERSALEDGER can be used to run your million dollar corporation. (IF YOU WANT IT TO)
- VERSALEDGER prints checks. (IF YOU WANT IT TO)
- VERSALEDGER stores all check information forever. (IF YOU WANT IT TO)
- VERSALEDGER can handle more than one checkbook. (IF YOU WANT IT TO)
- VERSALEDGER can be used to replace a general ledger. (IF YOU WANT IT TO)
- VERSALEDGER HAS AN ALMOST UNLIMITED CAPACITY
(300 checks per month on single density 5¼" disk drives such as the TRS-80 Model-I)
(500 checks per month on the Apple II)
(2400 checks per month on the TRS-80 Model III)
(6000 checks per month on the TRS-80 Model II)
(3000 checks per month on single density 8" CP/M)
- VERSALEDGER will soon have an add-on payroll package. (IF YOU NEED IT)

VERSALEDGER



INTRODUCTORY PRICE
\$99.⁹⁵

— CAN BE USED WITH 1 or MORE DISK DRIVES —

**VERSALEDGER HAS BEEN CREATED
WITH THE FIRST TIME COMPUTER USER IN MIND**

COMPUTRONICS
MATHEMATICAL APPLICATIONS SERVICE

50 N. PASCACK ROAD
SPRING VALLEY, NEW YORK 10977

ADD \$3.00 FOR SHIPPING IN UPS AREAS
ADD \$4.00 FOR C.O.D. OR NON-UPS AREAS
ADD \$5.00 TO CANADA AND MEXICO
ADD PROPER POSTAGE OUTSIDE U.S., CANADA & MEXICO



24 HOUR
ORDER
LINE

(914) 425-1535



**NEW TOLL-FREE
ORDER LINE**
(OUTSIDE OF N.Y. STATE)
(800) 431-2818

*** ALL PRICES & SPECIFICATIONS SUBJECT TO CHANGE ***

PERSONAL COMPUTING DEALERS

Many of the products and services listed in *Personal Computing* are available from the dealers listed here. This listing is in area-code order for easy reference.

ALASKA
Empire Electronic (206) 244-5200
Computerland (907) 272-1518
TV Mart Sales and Service (907) 277-2142

ALABAMA
Anderson Computers (205) 539-3444
Computerland (205) 344-4401
Computerland/Mobile (205) 342-2540
Madison Books (205) 772-9250
Olensky Brothers (205) 344-7448
University Supply Store (205) 348-6168

ARKANSAS
Computerland/Little Rock (501) 224-4508
Vaughn Electronics Corp (501) 636-2343

ARIZONA
All Systems Go (602) 966-4275
Computerland/Phoenix (602) 956-5727
Computerland/Tempe Mesa (602) 962-6732
Computerland/Tucson (602) 297-7023
The Computer Store (602) 866-0258
DataPlace (602) 266-6111
Desert News (602) 747-0428
Food for Thought (602) 327-9481
Heathkit Electric Center (602) 279-6247
Metro Computer Store (602) 323-3116
Micro Age Computer Store (602) 941-8794
Micro Age Computer Store (602) 790-8959
Personal Computer Place (602) 833-8949

CALIFORNIA
Electric Brain (209) 227-8479
Harding Way News (209) 464-7514
Micro Pacific Computer Ctr. (209) 229-0101
A-Vidd Electrs. Co. (213) 598-0444
Computer Components (213) 786-7411
Computer Forum (213) 921-2111
Computerland (213) 371-4624
Computerland (213) 246-2453
Computerland/Pasadena (213) 449-3205
Computerland/San Fernando (213) 716-7714
Computers are Fun (213) 475-5467
Computer Store (213) 451-0713
Dow Radio (213) 793-1195
E. T. Research (213) 597-4763
Heathkit Electric Center (213) 749-0261
HW Computers (213) 886-9200
HW Computers (213) 370-5556
Leavitt Distributors (213) 982-2514
Malibu Micro Computing (213) 456-1137
Micro Business World (213) 370-4842
O Pamp Technical Books (213) 464-4322
Rainbow Computing (213) 349-5560
Software Store (213) 473-1136
Advanced Computer Prods. (408) 946-7010
Central Campbell Computers (408) 370-0199
Computerland (408) 246-4500
Computerland (408) 267-2182
Computerland (408) 253-8080
Computer Plus (408) 624-7111
Computer Post (408) 735-1199
Heathkit Electric Center (408) 244-5300
Peninsula Computer Ctr. (408) 377-8920
Poor Richard's Almanac (408) 758-9840
Quement Electrs. (408) 425-1991
Zackit Monterey (408) 998-5900
Berkeley Computer (408) 375-3144
Byte Shop No. 1 (415) 526-5600
Computer Center (415) 969-5464
Computerland (415) 845-6366
Computerland (415) 794-9311
Computerland of the Castro (415) 864-8080
Computerland/El Cerrito (415) 527-8844
Computerland/Los Altos (415) 941-8154
Computerland/San Francisco (415) 546-1592
Computerland/Walnut Creek (415) 935-6502
Computer Post (415) 790-0410
Computer Store/San Leandro (415) 569-4174
Heathkit Electrs. (415) 236-8870
Keplers' Books (415) 948-5666
Marin Computer Center (415) 472-2650
Micro Age Computer Store (415) 786-5264
Micro Age Computer Store (415) 964-7063
P C Computers (415) 527-6657
Printers (415) 327-6500
Stacey's Bookstore (415) 421-4687
Stacey's Bookstore (415) 326-0681
Sunset Computers (415) 665-7378
Systems Formulate (415) 281-2621
Technika Berkeley (415) 524-8934
Computer Scene (707) 462-1578
Santa Rosa Computer Ctr. (707) 528-6480
Zackit Vallejo (707) 644-6676
Advanced Computer Prods. (714) 558-8813
Apple of Orange (714) 974-3082
Byte Shop (714) 565-8008
Byte Shop/Placentia (714) 524-5380
Computer Age (714) 565-4042
Computer City (714) 549-7749
Computerland (714) 464-5656
Computerland (714) 560-9912
Computerland/San Bernardino (714) 886-6838
Computerland/W. Los Angeles (714) 560-9912
Computerland/CA (714) 598-7505
Computer Merchant (714) 583-3963
Computer Merchant (714) 583-3963

Computer Metrics (714) 579-8066
Computer Post (714) 695-2000
Computer Station (714) 661-8062
Computer Store Chula Vista (714) 281-0285
Computer World (714) 891-2584
Consumer Computers (714) 465-8888
CTC-The Computer People (714) 565-0505
Dimensional Software (714) 275-4243
Heathkit Electric Center (714) 776-9420
James Games Computer Center (714) 985-3278
Integrated Circuits Unit (714) 278-4393
Marvac Electrs. (714) 540-3280
Net Profit Computers (714) 750-7318
The Wabash Apple (714) 768-3236
Byte Shop (805) 647-8945
Compusup (805) 942-5747
Computerland (805) 928-1919
Computer Plaza (805) 687-9391
Computer Plus (805) 963-4542
Computer Shop (805) 963-1325
Computer Solutions (805) 922-6639
Computer Sound (805) 945-5921
Computers To-Go (805) 496-2868
Dow Radio (805) 486-6353
Opshi Personal Electr. (805) 967-7100
Ventura County Computer Center (805) 648-5059
Byte Shop/Sacramento (916) 961-2983
Capitol Computer (916) 483-4729
Computerland/Sacramento (916) 920-8981
On Line Computer Center (916) 338-5447
Student Bookstore (916) 895-6044
Zackit Electrs. (916) 446-3131

COLORADO
Aparat (303) 741-1778
Colorado Computer Sys. (303) 426-5880
Computer Connection (303) 449-8282
Computer Connection (303) 449-8282
Computerland (303) 574-4170
Computerland/Denver (303) 759-4685
Computer Shack (303) 564-3545
Computer Technology (303) 427-4438
Computer Works (303) 449-6233
Micro Computer Mgmt. (303) 493-5700

CONNECTICUT
AM Computer Prods. (203) 621-2331
Aetna Life Club Store (203) 273-3058
Computer City (203) 521-2245
Computer City (203) 562-7546
Computer Ease (203) 877-7447
Computerland (203) 235-9204
Computerland/New Haven (203) 273-4807
Computer Store (203) 563-9000
Computer Store (203) 356-1920
Computer Store (203) 627-0188
Computer Works (203) 255-9096
Exel Sys. (203) 348-5894
Harold's Drugs (203) 583-1854
Logical Systems Inc. (203) 677-4557
Micro Age Computer Ctr. (203) 846-0851
Technology Sys. (203) 748-6856

DELAWARE
Computerland/New Castle (302) 738-9656
Computer Store (302) 478-7772
Micro Age Computer Store (302) 998-7340
Micro Products (302) 762-0227
Computerland (304) 624-6409

DISTRICT OF COLUMBIA
Computer Store (202) 272-0294
Pentagon Book Stores (202) 695-0870
Program Store (202) 337-4693
Students Book Co. (202) 223-3327

FLORIDA
Evans Business Computer Sys (209) 576-0451
A I Personal Computer (305) 339-8914
Byte Shop of Miami (305) 264-2983
Clarks Out of Town News (305) 467-1543
Computer Ctr./Palm Beaches (305) 689-3233
Computerland (305) 862-6202
Computerland/Boca Raton (305) 368-1122
Computerland/Ft. Lauderdale (305) 566-0776
Computerland/W. Palm Beach (305) 684-3338
Computer Scene (305) 945-1014
Computer Scene (305) 238-7238
Electronic Equipment Co. (305) 871-3500
H.I.S. Computeration (305) 254-9399
Lighthouse Book Store (305) 781-1945
West Indies Electr. (305) 556-1300
Computerland (813) 971-1680
Computerland (813) 392-0771
Computerland (813) 785-5579
Extra Extra Newstand (813) 886-1802
Henry's News Stand (813) 536-3863
Micro Computer System Inc. (813) 879-4301
Polling Place (813) 541-2729
Computerland (904) 224-9341
Computerland (904) 731-2471
Computer Shack (904) 396-1800
Computer Store/Gulf Breeze (904) 932-0660
Computer Sys. Resource (904) 376-4276
Florida Book Store (904) 376-6066
Goerings Book Ctr. (904) 378-0363
Grice Electrs. Inc. (904) 477-8100
Williams Radio and TV (904) 354-5460

GEORGIA
Atlanta Computer Mart (404) 455-0647
Baileys Computer Shop (404) 790-5771
Computerland/Atlanta (404) 953-0406
Guid News Agency (404) 252-4166
Electronics 21 Inc. (912) 352-0585

HAWAII
Amtec Inc. (808) 955-7429
Computer Center (808) 448-2171
Computerland/Hawaii (808) 521-8002
Data 1 Microcomputer (808) 946-1733

Radio Shack No. 7086 (808) 487-1509
Univ. of Hawaii Bookstore (808) 948-8022

IOWA
Memory Bank (319) 386-3330
The Partstore, Mario Iowa (319) 373-1803
Business Data Processing (515) 276-8858

IDAHO
Computer Co. Inc. (208) 375-9381
Computerland (208) 344-5545
Electronic Specialties (208) 376-5040
Northwest Computer Ctr. (208) 375-6681

ILLINOIS
Byte Shop (217) 352-2323
Computerland/Champaign (217) 359-0895
Computer-Ease (309) 833-3886
Wallace Micro-Mart Inc. (309) 685-7876
ABC Byte Shop (312) 673-3550
Book Market (312) 944-3358
Book Market (312) 440-4475
Byte Shop (312) 579-0920
Chicago Main Newstand (312) 864-2727
Complete Computing (312) 620-0808
Compushop (312) 593-1800
Computerland (312) 949-1300
Computerland (312) 967-1714
Computerland (312) 422-8080
Computerland/Naperville (312) 369-3511
Computerland/Northbrook (312) 272-4703
Computerland/Schaumburg (312) 253-3009
Data Domain/Schaumburg (312) 397-8700
Digitalworld (312) 628-9222
Erickson Communication (312) 631-5181
Illinois Microcomputer (312) 420-8813
Kroch's & Brentano's (312) 332-7500
Micro Computer Ctr./Geneva (312) 232-1545
Nabli's Inc. (312) 869-6140
Northbrook Computers (312) 480-9190
Oak Brook Computer Ctr. (312) 941-9005
Page One (312) 529-9060
Prairie News Agency (312) 883-1141
The Book Store (312) 255-8040
Videomart Inc. (312) 861-1255
Wine Micro Computers (312) 420-8813
Univ. Bookstore (815) 536-3321
Alpine Computer Ctr. (815) 229-0200
Appletree Computer (815) 758-8666
Computerland/Joliet (815) 741-3303
Computer Store/Rockford (815) 962-7580

INDIANA
Acro Electronics (219) 397-8681
Bytex (219) 485-7511
Computerland (219) 256-5688
Computerland (219) 483-8107
Computer Plus (219) 865-3930
Computer Room (219) 277-1515
Data Base (219) 484-3164
Computerland/Anderson (317) 649-1122
Computer Store (317) 662-9994
Graham Electrs. (317) 634-8202
Heathkit Electr. Ctrs. (317) 257-4321
Data Domain (812) 334-3607
Hoosier Electrs. (812) 232-8508

KANSAS
Amateur Radio Equip. (316) 264-9166
Computerland Hutchinson (316) 662-6832
Computerland (316) 684-3870
High Technology/Wichita (316) 262-0315
Gosub Int'l Inc. (316) 265-9858
Book Nook (913) no listing
Computerland (913) 492-8882
C mputerland/Topeka (913) 267-6550
Micro Age Computer Store (913) 823-7566
Online Computer Centers (913) 341-6651
Personal Computer Ctr. (913) 649-5942

KENTUCKY
Computer Emporium (502) 589-9482
Heathkit Electr. (502) 245-7811
Computer Place (606) 276-3594

LOUISIANA
Computer Shoppe Inc. (504) 454-6600

MAINE
Home Port Computers (207) 873-2192
Retail Computer Ctr. (207) 669-6736

MARYLAND
Bethesda Computers (301) 657-1992
Chaffitz (301) 340-3300
Computer Crossroads (301) 730-5513
Computers Etc. (301) 268-5801
Computers Etc. (301) 268-5801
Computers Etc. (301) 296-0520
Computerland (301) 340-8484
Computerland/Towson (301) 337-5555
Computer Unlimited (301) 321-1553
Heathkit Electrs. (301) 881-5420
Komar Ltd. (301) 675-2200
Logical Choice (301) 465-3175
Micro Age (301) 762-7585
Muse Computer Ctr. (301) 659-7212
Personalized Computer Consul. (301) 840-0412
Program Store/Baltimore (301) 944-0200
Radio Shack (301) 224-2900
The Comm. Center (301) 792-0600
Wills Computer Store (301) 423-4525

MASSACHUSETTS
Computer Source (413) 443-7181
Retail Computer Ctr. (413) 589-0106
Small Computer Data Sys. (413) 592-6600
Computer City (617) 755-5464
Computer City (617) 875-8126
Computer City (617) 273-3146
Computer City (617) 242-3350
Computer City (617) 826-9217
Computer City (617) 774-7118
Computerland/Boston (617) 235-6652

Computerland/Boston	(617) 482-6033	Comtek/Staten Island	(212) 698-7050	Computer City	(401) 331-2187
Computer Store	(617) 232-5470	Datel Sys.	(212) 921-0110	Computer Power	(401) 738-4477
Computer Store	(617) 354-4599	Harcourt Brace Bookstore	(212) 888-3333	Computer Store	(401) 272-8770
Harvest Computer	(617) 547-3289	Magazine Emporium	(212) 864-0500	SOUTH CAROLINA	
Heathkit	(617) 531-9332	Majority New Dist.	(212) 243-7770	Datamart/S. Carolina	(803) 233-5753
Heathkit Electrs.	(617) 237-1510	Papyrus Books	(212) 864-8862	Gismo Comm.	(803) 366-7157
Heathkit Electrs.	(617) 531-9330	Super Business Machines	(212) 964-6666	SOUTH DAKOTA	
Land of Electronics	(617) 581-3133	Computers Etc.	(315) 446-6502	Computerland	(605) 338-5263
New England Electronics CO	(617) 449-1765	Computerland/Massina	(315) 769-9971	Computerland/Rapid City	(605) 348-5384
Out of Town News	(617) 354-7777	Berliner Computer Ctr.	(516) 775-4700	TENNESSEE	
Palace Spa	(617) 783-5858	Computerland/Little Neck	(516) 887-4747	Campus Computers	(615) 327-9123
Retail Computer Ctr.	(617) 935-8060	Computerland/Nassau County	(516) 742-2262	Chatanooga Computer Ctr.	(615) 892-7038
Small Business Group	(617) 692-3800	Computer Concepts	(516) 374-0255	Computerland	(615) 246-6173
Video Station	(617) 933-1445	Computer Headquarters	(516) 698-8636	Computerland/Knoxville	(615) 693-8225
YDI Electrs.	(617) 449-1005	Computer Microsystems	(516) 627-3640	Eastern Micro Computer	(615) 594-8365
MICHIGAN		Computer Shoppe	(516) 758-6558	Rush Electrs.	(615) 764-0831
Community News Center	(313) 662-6150	Data Scan Comp. Sys.	(516) 698-6285	Computerland/Memphis	(901) 761-4741
Computer Center	(313) 422-2570	Future Visions Computer	(516) 423-7820	Tobacco Corner	(901) 767-0233
Computer Connection	(313) 447-4470	Harrison Radio	(516) 293-7990	TEXAS	
Computer Horizons	(313) 464-6502	Heathkit Electrs.	(516) 334-8181	Compushop	(214) 234-3412
Computerland	(313) 772-6540	L.I. Computer Store	(516) 887-1500	Computerland	(214) 363-2223
Computerland/Southfield	(313) 356-8111	Programs Unlimited	(516) 997-8668	Computerland/Tyler	(214) 581-7000
Computer Mart	(313) 288-0040	Spartan Electrs.	(516) 499-9500	Computer Video Sys.	(214) 423-3654
Computer Mart/Flint	(313) 234-0161	Syosset Video & Electrs.	(516) 921-5454	Heathkit Electrs. Ctr.	(214) 826-4053
Front Page Bookstore	(313) 332-3431	Adirondack Electrs.	(518) 346-4717	Percon	(214) 272-3421
Heathkit Electr.	(313) 772-0416	Castle Computers	(518) 783-9405	Micro Store	(214) 231-1096
Heathkit Electr. Ctr.	(313) 535-6480	Computer Room	(518) 899-3618	Software Concepts	(214) 458-0330
Level 4 Products	(313) 525-6200	Future Distribution	(518) 561-5703	BAPS	(212) 657-7034
New Horizons Book Shop	(313) 296-1560	Computerland/Ithaca	(607) 277-4888	Computerland	(512) 724-1551
Rainbow Computers	(313) 528-3535	Computer Tree	(607) 748-1223	Computer Lab	(512) 452-5701
Rochester Book Center	(313) 651-0199	Computerland	(716) 586-0378	Computer 'N' Things	(512) 453-5970
Simtec	(313) 855-3990	Computerland/Buffalo	(716) 836-6511	Computer Shop	(512) 828-0553
Spectrum Computers	(313) 559-5252	Computer Resource	(716) 633-9510	Computer Solutions	(512) 341-8851
Community News	(517) 321-8797	Computer Store-Rochester	(716) 244-5000	Computer To-Go	(512) 472-8926
Community Newscenter	(517) 694-0490	Computer Ctr.	(716) 244-6237	Expensive Toys/Big Boys	(512) 340-5600
Community Newscenter	(517) 349-3510	Modern Tek Shop, Inc.	(716) 839-5800	Heathkit	(512) 341-8876
Computerland/Grand Rapids	(616) 842-9231	Micro Age Computer Store	(716) 244-9000	Micro Age Computer Store	(602) 894-9247
Computer Mart/Lansing	(517) 351-1777	Readout Computers	(716) 634-9354	City Electr. Supply	(713) 621-1060
Computers & More	(616) 243-3525	Summit Dist.	(716) 887-2800	Compushop	(713) 893-2060
Micro Computer World	(616) 451-8348	Computer Corner	(914) 949-3282	Computer Center/Houston	(713) 527-8008
NCE/Computart	(617) 491-2700	Computer Store	(914) 428-1661	Computercraft	(713) 977-0664
MINNESOTA		Heathkit	(914) 761-7690	Computerland/Houston Bay	(713) 498-8153
Computata	(218) 722-6319	Mr. Computer	(914) 297-1223	Computerland/Westwood	(713) 270-1200
Granada News	(218) 727-9122	Programs Unlimited	(914) 761-9283	Computer Technique	(713) 947-9633
Readmore Book & Card	(612) 375-2534	NORTH CAROLINA		Lone Star News	(713) 981-0288
ABS Computer	(612) 375-2008	Byte Shop	(704) 568-8100	Micro Age Computer Store	(713) 270-9647
Computer Depot	(612) 375-2008	Computer Alternatives	(704) 274-5404	Micro Age Computer Store	(713) 440-7547
Computerland	(612) 559-1884	Computerroom	(704) 377-9821	Northwest Newstand	(713) 681-7310
Digital Den	(612) 699-8442	Book Nook	(919) 725-3696	The Computer Store	(713) 846-7766
Heathkit Ctr.	(612) 938-6371	K & S Newstand	(919) 724-7537	Waghalter Books	(713) 527-9970
Micro Age Computer Store	(612) 338-1777	Liberty News & Beverage	(919) 493-1180	Westheimer Newstand	(713) 817-7793
Minnesota Book Center	(612) 373-5734	Worldwide News & Specialties	(919) 467-7130	Young Electrs.	(713) 693-8080
Readmore Bookstore	(612) 333-3622	NORTH DAKOTA		Agriplex Computers	(806) 797-4495
Schindler's Hennepin News	(612) 333-6942	Computerland/Fargo	(701) 237-3069	Computer Port	(817) 469-1502
Shinder Book & News	(612) 227-0899	Computerland/Grand Forks	(701) 746-0491	Computer Pro	(817) 654-3360
MISSOURI		OHIO		Software & Peripherals Ltd.	(817) 566-3888
Computer Country-North	(314) 921-5644	All Media Material	(216) 678-5499	Waco Comm.	(713) 772-3505
Gateway Electrs.	(314) 427-6116	American Bookstore, New Parma	(216) 888-8210	UTAH	
Micro-Age Computer Ctr.	(314) 567-7644	Basic Computer Shop	(216) 867-0808	Central Utah Electrs.	(801) 373-7522
Computerland/St. Louis	(314) 567-3291	Computer Corner	(216) 473-5010	Computerland	(801) 224-2608
Computer Mart/Springfield	(417) 862-6500	Computerland/Akron-Canton	(216) 493-7766	Computerland/Salt Lake	(801) 364-4416
House of Computers	(417) 782-0880	Computerland/Cleveland	(216) 461-1200	Quality Technology	(801) 521-5040
Southeastern Audd. Vis.	(601) 324-0797	Computerland/Warren	(216) 544-4191	VERMONT	
MONTANA		Cosmic Comics	(216) 784-3449	Kennedy Sys	(802) 626-8457
Computerland Billings	(406) 259-0565	Hudson Computer	(216) 653-9010	VIRGINIA	
Consolidated Services	(406) 721-1811	News Depot	(216) 454-4444	Computer Store	(617) 272-0294
Prairie Computers	(406) 727-6992	Newstand	(216) 235-9321	Arlington Electric Wholesale	(703) 524-2412
NEBRASKA		Abacus II	(419) 865-1009	Computerland/Tyson's Corner	(703) 893-0424
Computerland/Lincoln	(402) 345-6020	Computer Connection	(419) 222-6464	Computers Plus	(703) 982-3661
Computerland/Omaha	(402) 391-6716	Leo's Book & Wine Shop	(419) 255-5506	H.B. Computer Ctr.	(703) 971-1996
Electronic Center	(402) 476-7331	Micro Computer Ctr.	(513) 435-9355	Heathkit Electrs.	(703) 295-1975
NEVADA		News - Readers	(513) 879-4444	Home Computer Ctr.	(703) 765-5515
Century 23	(702) 870-1534	Wilkie News	(513) 223-2541	Program Store	(703) 595-1955
Computer Store	(702) 826-5055	Micro Age Computer Store	(614) 868-1550	Virginia Micro Sys.	(703) 536-5404
Home Computers	(702) 736-6363	OKLAHOMA	(614) 486-5381	V.P.I. Facilities	(703) 491-6502
PCS Computer Service	(702) 870-4138	Book Shack	(405) 233-1588	Computerland/Richmond	(804) 741-3536
NEW HAMPSHIRE		Computerland/Oklahoma	(405) 755-5200	Home Computer Ctr.	(804) 340-1977
Blitznoyes	(603) 224-8233	Computer Service Unlimited	(405) 329-2154	WASHINGTON	
Chips Microcenter	(603) 843-5413	Computer Works	(405) 624-5276	A B C Comm.	(206) 364-8300
Computer City	(603) 668-9527	Employee's Assoc. Bookstore	(405) 686-4295	Amateur Radio Supply Co.	(206) 767-3222
Computerland/Nashua	(603) 889-5238	High Technology Detail	(405) 528-8008	Byte Shop	(206) 622-7196
Computer Mart/New Hampshire	(603) 883-2386	Micro Age Computer	(405) 728-1837	Central Computers	(206) 746-5227
Computer Town	(603) 893-8812	Computerland/Tulsa	(918) 481-0332	City News	(206) 455-9683
NEW JERSEY		Computer Store	(918) 224-5347	Computerland	(206) 581-0388
Apple Cor.	(201) 766-3977	OREGON		Computer & Video Ctr.	(206) 695-1540
Computerability	(201) 643-5413	Byte Shop	(503) 644-2686	Data-Borne Computers	(206) 248-0101
Computer Corner/New Jersey	(201) 835-7080	Computerland/Portland	(503) 620-6170	Empire Electrs.	(206) 244-5200
Computer Dimensions	(201) 232-8300	Computer Solutions	(503) 689-9677	Heathkit	(206) 682-2172
Computer Forum	(201) 530-9103	Computer Specialties	(503) 399-0534	Mentor Personal Comp.	(206) 246-5357
Computerland	(201) 845-9303	Computer Store Corvallis	(503) 754-0811	Western Micro Computer Ctr.	(206) 527-0909
Computerland/Morristown	(201) 539-4077	C 2 E	(503) 245-9785	Alpha Computer Sys.	(206) 678-9558
Computermart/New Jersey	(201) 283-0600	Fifth Avenue News	(503) 222-7462	Personal Computers	(509) 586-7603
Computer Nook	(201) 253-0600	Micro Age Computer Store	(503) 256-4713	Rob Roy Computer Shop	(509) 534-3955
Computer Universe	(201) 575-9468	New Day Computing	(503) 223-8033	WISCONSIN	
Comtek	(201) 262-0960	Norvac Electrs.	(503) 644-1025	Asmus Electronics	(414) 923-4107
Earth Rise Micro Sys.	(201) 472-2440	Rich Cigar Store	(503) 228-1700	Byte Shop/Milwaukee	(414) 281-7004
Heathkit Electr. Ctr.	(201) 822-0518	PENNSYLVANIA		Chester Electr. Supply	(414) 658-4616
Radio Shack	(201) 791-6935	Computer Forum	(215) 296-3474	Computers Unlimited	(414) 355-5206
Software Asylum	(201) 244-7494	Computerland/Dresler	(215) 542-8835	Computerworld	(414) 733-9547
Software City	(201) 969-0637	Computerland/Lehigh Valley	(215) 776-0202	Digital Den	(414) 475-6020
Stoneledge Computer	(201) 342-8788	Computerland/Paoli	(215) 296-0210	Four J's	(414) 466-8990
Bargain Brothers	(609) 883-2050	Computer Store	(215) 322-5947	American Computer Sys.	(608) 257-1348
Clancy Paul	(609) 683-0060	Drexel University Book Store	(215) 895-2000	Century Computer	(608) 788-2350
Computer Encounter	(609) 924-8757	Heathkit Electr. Ctr.	(215) 268-0180	Computerland/LaCrosse	(608) 781-2090
Computerland/Cherry Hill	(609) 795-5900	Heathkit Electr. Ctr.	(215) 647-5555	Computerland/Madison	(608) 273-2020
Computer Workshop	(609) 429-5703	Martek Sys.	(215) 947-6670	WEST VIRGINIA	
Personal Computing	(609) 927-3880	Mighty Byte Computer Ctr.	(215) 443-9020	Computerland	(304) 744-7962
Radio Shack	(609) 234-2666	20 20 Computers	(215) 439-1800	Computerland/Parkersburg	(304) 485-6823
NEW MEXICO		Computer House	(412) 921-1333	Computer Store	(304) 345-1360
Computer Shop	(505) 762-3327	Computer Workshope	(412) 823-6722	Nicks News	(304) 697-2459
Electronic Parts Co.	(505) 293-6161	Erie Computer Co.	(412) 454-7652	WYOMING	
Micro Waves Computer Store	(505) 883-0955	Pittsburgh Computer Store	(412) 391-8050	Computerland	(307) 634-9552
Computer Tech Assoc.	(915) 533-2108	A & B Computers	(717) 822-7727	Computerland/Casper	(307) 234-2879
NEW YORK		Computer Store	(717) 272-0294	CANADA	
Computer Center	(212) 889-8130	Computerland/Harrisburg	(814) 533-6892	Galatica Computers	(403) 424-7007
Computer Era	(212) 860-0500	RHODE ISLAND		Micron Dist.	(416) 361-0609
Computerland	(212) 840-3223	Computerland	(401) 274-5100	Lichtman's News	(416) 961-1466
Computer Store	(212) 832-2180				
Comtek/Brooklyn	(212) 332-5933				

**We will meet or
beat any price
in the U.S.A. on**



TRS-80 MICROCOMPUTERS

In fact, no matter what price you see advertised by Texas Computer Systems, Micro Management, Computer Plus, Pan American, or any authorized Radio Shack dealer for TRS-80 Computers with pure factory installed memory and full warranty, we'll beat it!



We have consistently offered the best prices on

**APPLE • COMMODORE VIC-20
OKIDATA • MICROLINE
EPSON • WABASH • MAXELL**

— plus a complete line of Diskettes, Monitors, Modems and other accessories — all at the best delivery from the largest inventory in the Northeast.

If you're looking for the best prices in the U.S.A., check the others, but call Computer Discount of America.

TRS-80 and Radio Shack are trademarks of Tandy Co.

Write or call for FREE Computer Catalog with pictures, specs, accessories and prices.

**CALL TOLL FREE:
800-526-5313**

**Computer
Discount
of America**

COMPUTER DISCOUNT OF AMERICA, INC.
15 Marshall Hill Road, West Milford Mall
West Milford, New Jersey 07480-2198
In New Jersey Call 201-728-8080

CIRCLE 118

168 PERSONAL COMPUTING April 1982

ADVERTISERS INDEX

Many of *Personal Computing's* advertisers will send further information about their products and services. Simply circle (on the readers' service card) the bold number that appears to the left of the advertiser's name in the list below. If there is no number listed on the left, kindly write or call the advertiser.

Circle No.	Page No.	Circle No.	Page No.
56	Aardvark Technical Services 115	100	Microcomputer Technology, Inc./MTI 150
24,32	Ace Computer 160-5	106	Micro Con Software Centers, Inc. 154
	Addison-Wesley Publishing Co. 28,89	122,131,96	Micro Lab, Inc. 96,146,158
	Advanced Computer Products 160-16, 160-17	145	Micro Learningware 163
129	Alphanetics 160-15	125,82	MICROMAIL 126,136
	The Alternate Source 160-5	117	Micro Management Systems, Inc. 163
130	American Business Computers 160-12	63	Micromate Electronics, Inc. 77
78	Anadex 120,121		Micro Mountain Software 160-11
30	Apple Computer Inc. 84,85	88	Microperipheral Corp. 136
108	Appletree Electronics 56	33	MicroPro International 135
109	Applied Software Technology 155	59	Microtek, Inc. 113
31	ARCsoft Publishers 86		Micro-Ware Distributing 160-15
	Artworx 160-27	104	Monument Computer Service 125
80,44,66	ASAP Computer Products 90,100,127	2	Mountain Computer 1
144	Aspen Ribbons, Inc. 163	65	National Data Supplies, Inc. 147
83	Avant-Garde Creations 137	1	NEC Home Electronics C-2
109	Axiom Corporation 99	51	North Star Computers 34,35
26	BASF Systems Corporation 91		Okidata 71
98	Basic Time 148		Omega Microwave, Inc. 160-24
34,35	Bausch & Lomb/Inst. & Sys. Div. 40	86	Orange Micro, Inc. 138
126	Benchmark Software 120	4	Osborne Computer Corporation 6
	Business Computers of Petersburg 160-5	91	Osborne/McGraw-Hill 131
99	BT Enterprises 134	137	Pacific Exchanges 162
29	Centronics 155		Palomar Computer Products 160-4
14	Chang Labs 107		Pan American Electronics 160-26
76,79	CLOAD Magazine, Inc. 80	36	Peelings II 98
97	Comm Data Systems, Inc. 142		Perry Oil & Gas 160-20
120	Commodore C-4		Personal Software/See Visicorp 32
	Communications Electronics 160-10		Philadelphia Computer Discount 160-30
	Compumart 143	39	Plus Computer Technology 93
23	Compusoft Publishing 63		Professional Office Data Management 160-8
90	Computer Case Company 140	70	Programmers Institute 130
118	Computer Discount of America 168		Que Corp. 160-13
110	Computer Mail Order 156	42,43	Racet Computers 108
121	Computer Services Corp. of America 19	17	Radio Shack 45
	Computer Shopper 160-8	22	Rana Systems 66,67
114	Computer Shopping Center 161	115	RCA Corporation 123
	Computer Warehouse 160-14	146	RH Electronics 163,160-3
	Computer West 160-20	77	Riverbank Software, Inc. 149
95	Computronics 165	107	Robec, Inc. 128
55	Consumer Computers 114	11	RockRoy Inc. 20
6	Corona Data Systems 16,17		Saturn Systems 160-18
9	Corvus Systems 12	139	Scelbi Press/Pocket Newsletter 162
116	CPU Shop 164	123	Seabird Press 162
40	Crystalware 94,95	84	Select Information Systems 112
45	Cuesta Systems 14	105	Sensible Software, Inc. 153
50	Cybernetics 104		Shannon Magnetics 160-25
27	Decision Support Software 77		Sinclair Research, Ltd. 38,39
15	Denver Software Co. 43	140	Skyles 162
142	Digital Systems 163		Soft Sector Marketing, Inc. 160-19, 160-21
	Dresselhaus Computer Products 149		Software Concepts 160-8
71	Dymarc Industries 142	142	Software Consulting Services 163
	Dynacomp, Inc. 160-22, 160-23	21	Software Publishing Corp. 57
10	Edu-Ware Services, Inc. 50		Software Solutions 160-3
12	Epson America, Inc. 97	85	Software Technology for Computers 124
	EstiComp Software 160-12	13	The Source Telecomputing Corp. 23
94	Futra 144		Southeastern Educational Software 160-26
136	Hanco 162	25	Southwestern Data Systems 68,69
128,103,111	Hayden Book Co., Inc. 139,152,159,160-26,160-28,160-29	49	SSM Microcomputer Corp. 109
57	Hayes Microcomputer Products Inc. 111	93	Standard Software Corp. 144
127	Heath Company 160	61	Street Electronics Corp. 119
52	Howard Sams 101	47	Structured Systems Group 9
28	Howard Software Services 13		Swift Software 160-20
3	IBM Corporation 4	46	Synapse 134
	Imprint Editions, Inc. 160-2	8	Systems Plus 15
58	Innovative Computer Products 78	81	Tarbell Electronics 140
54	Jim Scott 110	73	Target Software 88
20	Jini Micro Systems 145		Technology Magazine 25
	Kartes Productions, Inc. 87	16	TecMar, Inc. 29
69	Konan Corporation 151	133	T.H.E.S.I.S. 162
5,119	Leading Edge Products, Inc. 11,C-3	67	TMI 128,160-15
7	Lexisoft, Inc. 79	64	TransNet Corporation 125
113	Link Systems 105	37	Unicomm 76
38	Lobo Drives, International 103		Visicorp/see Personal Software 32
68	Logo Computer Systems 129		VR Data 160-6, 160-7
18	3M Company 48	62	Videx 122
19	Maxell Corporation of America 81	102	Visible Computer Supply Corp. 130
132	M.B. Rowe & Associates 162	53	Vista Computer Company 60
124	Meta Technologies 157,160-9,160-31	135	Vynet Corporation 162
101	Micro Age Computer Stores 141	41	Western Digital 21
60	Micro Applications Group 116,117		Westico, Inc. 118
134	Micro Architect, Inc. 162	74	Write Writer, Inc. 133
72	Micro Business World, Inc. 132		Zircan International, Inc. 160-3
89	Micro Compatible 126		

ADVERTISING STAFF

SALES ADMINISTRATOR
Joy Nichols

SALES COORDINATOR
Anne Lacitignola

ASSOCIATE PUBLISHER
Jeff Weiner

PUBLISHER
Robert J. Lydon

DISTRICT MANAGERS

Ferris Ferdon (214) 231-0523

William Knickel (408) 736-6667

Robert Pavone (201) 843-0550

Donna Quinn (408) 736-6667

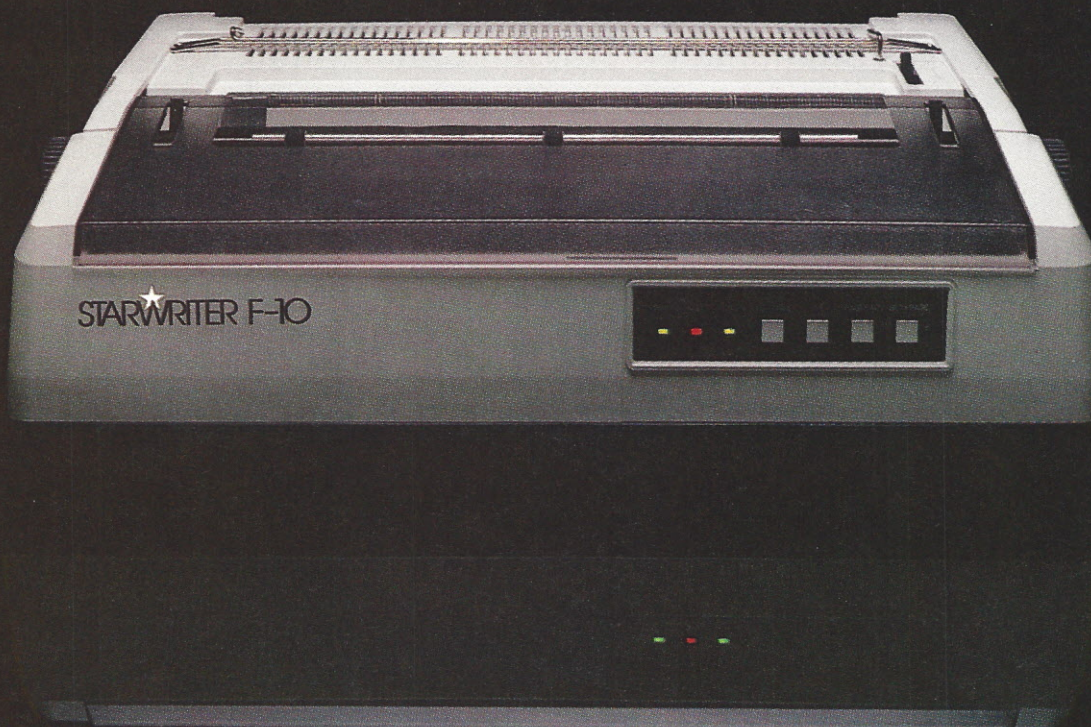
Michael Reynolds (213) 641-6544

Arlene Schulman (201) 843-0550

JAPAN

Haruki Hirayama 402-4556

SAVE 6 INCHES, 10 POUNDS, AND \$800.



On the new, slicked-up, trimmed-down Starwriter F-10.

It's C. Itoh's latest generation of letter-quality printers.

It cranks out flawless copy at 40 cps; and its full 15" carriage lets it double in brass for both letter processing and business applications. You can plug it into almost any micro on the market (serial or parallel) simply by plugging it in. And then make it keep on trucking with inexpensive, easily available Diablo com-

patible daisy wheels and ribbons.

In its serial mode, it can print just about anything (including boldface, underlines, subscripts and superscripts), and snap the carriage back to start the next line in less than a second. In its line mode, it prints in both directions, for even faster throughput.

(While making about as much noise as a cat walking on Kleenex.)

It's a nice, portable 30 pounds—about 10 pounds

lighter than the Starwriters before it. And it stands exactly as tall (or precisely as small) as a dollar bill.

Speaking of which:

Incredibly, the Starwriter F-10 sells for about the same preposterously low price as its predecessors. Which is to say, about \$800 less than a lot of other printers that don't even come close to measuring up. Or even better...

Measuring down.

Distributed Exclusively by Leading Edge Products, Inc., 225 Turnpike Street, Canton, Massachusetts 02021. Call: toll-free 1-800-343-6833; or in Massachusetts call collect (617) 828-8150. Telex 951-624.

**LEADING
EDGE.**

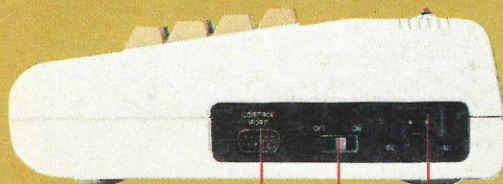


COMMODORE VIC-20®

"THE WONDER COMPUTER OF THE 1980s. UNDER \$300."

—WILLIAM SHATNER

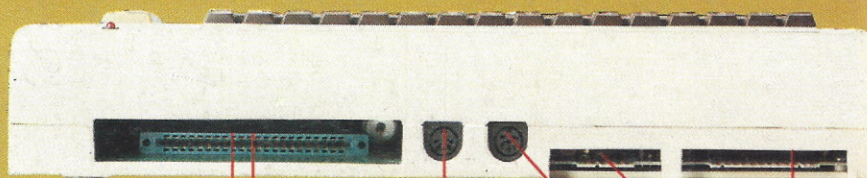
"The best computer value in the world today. The only computer you'll need for years to come."



JOYSTICK
PADDLE
LIGHTPEN

ON/OFF SWITCH

POWER
PACK



PLUG-IN
PROGRAMS

3K/8K/16K
MEMORY
EXPANSION

PLUG-IN
PROGRAM

EXPANSION
MODULE

RF
MODULATOR

TELEVISION
OR MONITOR

VIDEO CABLE

SINGLE
DISK DRIVE

PRINTER

COMMODORE
DATACASSETTE

MODEM FOR
TELEPHONE AND
TELECOMPUTING

VIC-20® VS. OTHER HOME COMPUTERS

Product Features	Commodore VIC-20	Atari® 400™	TI® 99/4A	TRS-80® Color Computer
Price*	\$299.95	\$458.95	\$499.00	\$399.00
Maximum RAM Memory	32K	16K	16K	32K
Keyboard Style	Full-Size Typewriter Style	Flat Plastic Membrane	Half-Size Typewriter Style	Calculator Style
Number of Keys	66	57	40	53
Programmable Function Keys	4	0	0	0
Graphic Symbols On Keyboard	62	0	0	0
Displayable Characters	512	256	64	256
Microprocessor	6502	6502	TI990	6809
Accessible Machine Language	YES	YES	NO	YES
Upper/Lower Case Characters	YES	YES	NO	NO
Operates with all Peripherals (Disk, Printer and Modem)	YES	NO	YES	YES
Full Screen Editor	YES	YES	NO	NO
Microsoft Basic	Standard	N/A	N/A	\$ 99.00
Telephone Modem	\$109.95	\$399.95	\$450.00	\$154.95

*Manufacturer's suggested retail price Jan. 1, 1982. Includes BASIC cartridge required for programming.



Read the chart and see why COMPUTE! Magazine¹ calls the VIC-20 computer "an astounding machine for the price." Why BYTE² raves: "...the VIC-20 computer unit is unexcelled as a low-cost consumer computer." Why Popular Mechanics³ says "...for the price of around \$300, it's the only game in town that is more than just a game." And why ON COMPUTING INC.⁴ exclaims: "What is inside is an electronic marvel... if it sounds as if I'm in love with my new possession, I am."

The wonder computer of the 1980s. The VIC-20 from Commodore, world's leading manufacturer of a full range of desktop computers. See the VIC-20 at your local Commodore dealer and selected stores.

1 April '81 issue 2 May '81 issue 3 November '81 issue 4 Fall '81 issue



Commodore Computer Systems VIC-PC
681 Moore Rd., King of Prussia, PA 19406
Canadian Residents: Commodore Computer Systems
3370 Pharmacy Ave., Agincourt, Ont., Canada, M1W 2K4

Please send me more information on the VIC-20.

Name _____

Address _____

City _____ State _____ Zip _____

Phone _____